MINING CONGRESS JOURNAL

Only Yesterday

coal mining was a pick and shovel business (a hand-labor job). Those days are gone. Today even the house next door burns its coal in a stoker. Coal must be prepared to fit the market.

Sooner or later you will want to give your mine the advantage of equipment that is up to the minute, equipment built to meet today's and post war demands. And the sooner you do it the sooner you profit.

Whether your problem is to clean fine coal or to clean coarse coal, to clean it wet or to clean it dry or to use a combination of methods, Roberts and Schaefer can give you the benefit of many years of experience in doing the job for large mines and for small mines.

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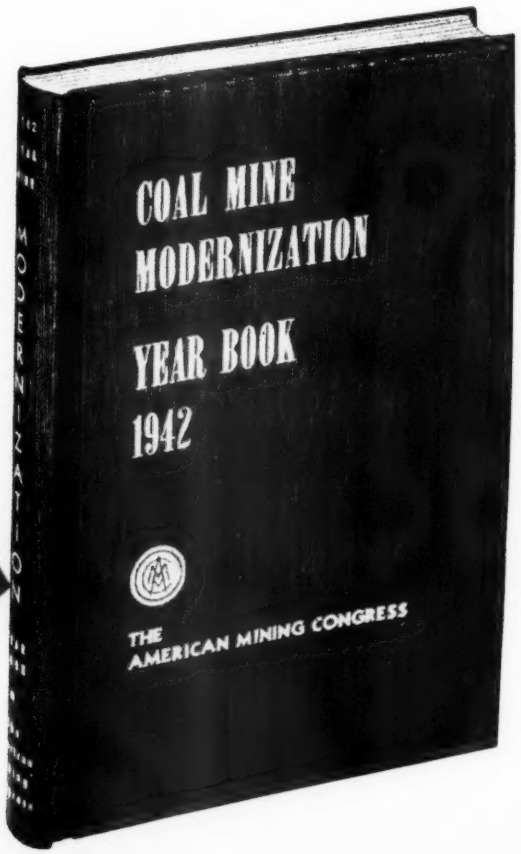

The complete papers and discussions of the 19[illegible] Convention—a compilation of the best thought of the industry on every important subject—Safety, Wartime Personnel Problems, Espionage and Sabotage, Coal Production and Distribution, Priorities on Mining Equipment, Coal Preparation, Mechanical Loading, Conveyor Mining, Maintenance and Repair, Conservation of Equipment, Strip Mining and many others. A handy reference book for the busy coal man. Order NOW!

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MINING CONGRESS JOURNAL

Vol. 28 APRIL, 1942 No. 4

All men between 20 and 44 who registered on February 16 will soon receive a questionnaire, together with a list of 225 jobs essential to war production. The men should check the jobs indicated on the list in which they have had experience and return the completed forms to the local Selective Service Board.

In registering the skills for the Selective Service System, employers have been urged to explain the significance of the questionnaire, and to help employes in filling them out. It is suggested that each occupational key man's case be carried individually to the local draft board in order to prevent undue loss of personnel.

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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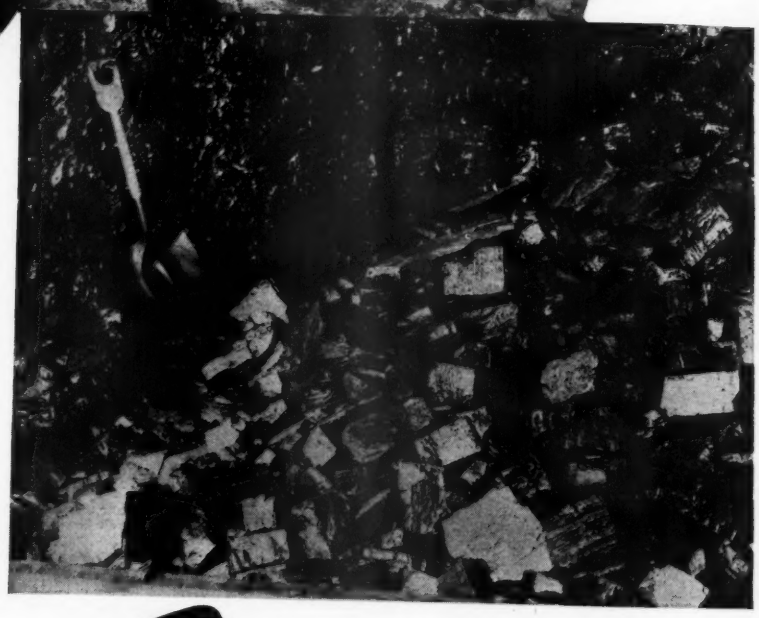
That Industry may profit by ...se



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BUILT THROUGH

DEPENDABLE

Service

THE POLICY of American Cyanamid & Chemical Corporation is to manufacture explosives and blasting supplies of the highest quality, and to supplement them with competent research and technical services to the end that industry may profit by their use.

These services begin in the research laboratories and at the plants.

Modern laboratories have been provided for accurate control of processes and products. Research is carried on continuously by trained chemists on problems pertaining to the manufacture and use of explosives and blasting supplies. Plants are located at points near the sources of raw materials and convenient to the industries they serve.

Competent sales representatives are at your call for discussions in connection with deliveries or blasting problems. Supplementing the sales force, a group of engineers trained in the use of explosives is available for consultation on the problems of mining, quarrying, construction projects and other applications of these products.

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HIGH EXPLOSIVES

PERMISSIBLES

BLASTING POWDER

BLASTING ACCESSORIES

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A Unit of American Cyanamid Company

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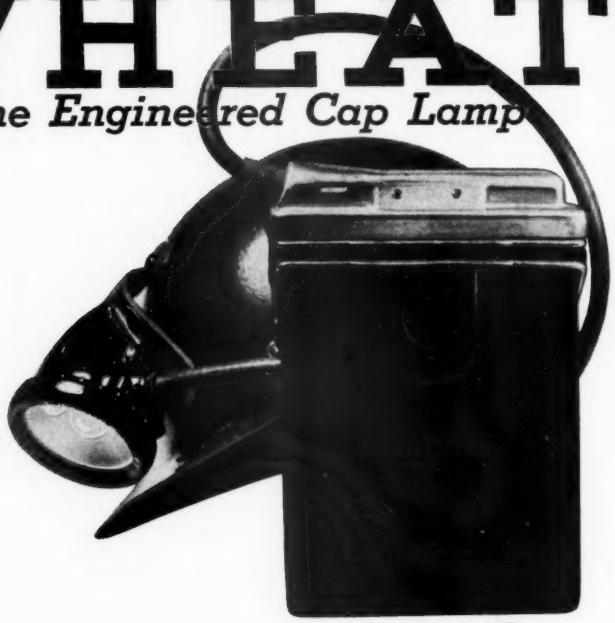
the swing is to

WHEAT

The Engineered Cap Lamp



12 *Reasons why*

1 Two bulbs (one for emergencies) — miner is never in the dark.

2 Center mounted, Krypton-filled bulb, gives 20% more light — no dark "shadow spot" in beam.

3 Choice of 3 reflectors gives narrow concentrated beam, a medium beam, or a widespread beam of light — suits all working conditions.

4 Headpiece weighs less than 6 ounces, Lamp Cord 6 ounces, Battery 62 ounces — Total weight of Lamp complete 74 ounces.

5 Headpiece molded of strong bakelite; sealed, moisture-proof and dust-proof.

6 Rubber battery case — non-conductor of electricity — a valuable safety feature.

7 Battery solution (free) limited to one ounce total both cells.

8 Lead-acid type battery maintains high voltage throughout shift (80+% efficiency) — year after year.

9 Battery charged through headpiece and cord of cap lamp — a daily test of all connections.

10 Designed for self-service charging system for lowest lamp-house operating cost.

11 To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart — unit-sealed construction.

12 A payment plan (purchase or rental) to meet the requirements of companies — large and small.

Note — More New Wheat Cap Lamps were installed in the U.S.A. during 1940-1941 than in any previous 2-year period

SPECIALISTS IN MINE LIGHTING FOR 25 YEARS

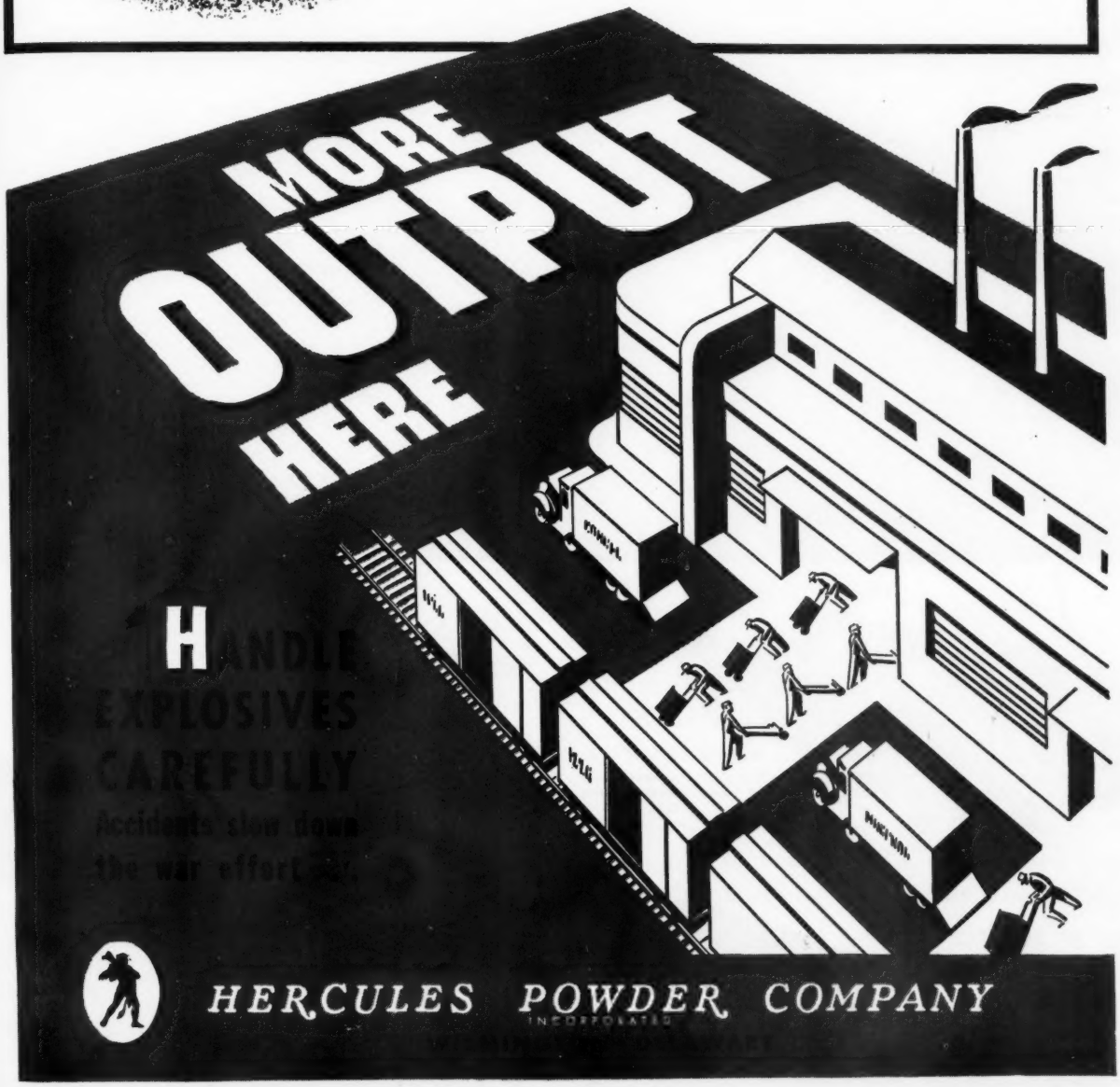
KOEHLER MFG. CO.

Marlboro · · · Mass.

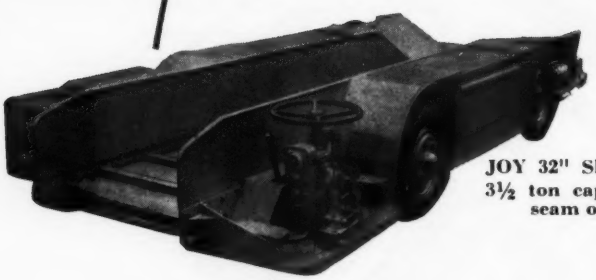
WESTERN U.S.A.: E. D. BULLARD CO., SAN FRANCISCO, CAL.
CANADA: H. C. BURTON & CO., HAMILTON, ONTARIO.

BETTER LIGHT - LESS WEIGHT
NON-SPILLABLE

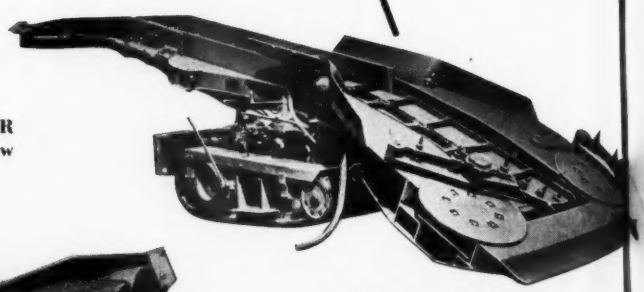
SAFETY
HERE MEANS...



IS FARMING MORE MODERNIZED THAN COAL MINING?

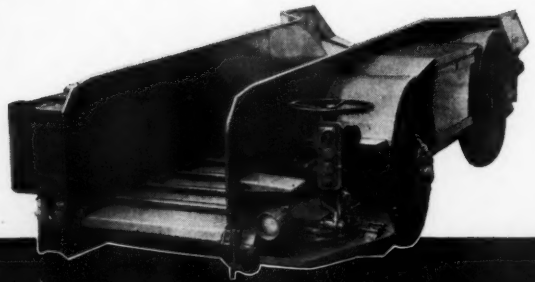


JOY 32" SHUTTLE CAR
3½ ton capacity for low seam operations.



JOY 11-BU LOADER
A heavy duty machine of high capacity, 8-10 tons per minute.

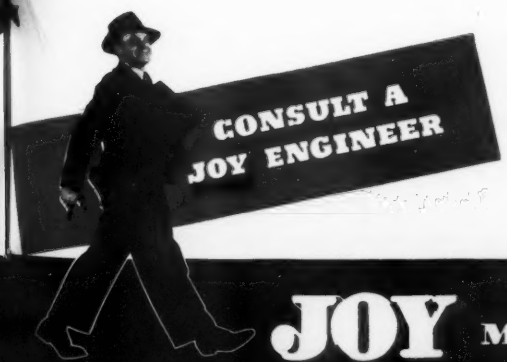
JOY 42" SHUTTLE CAR
6 ton capacity for high seams.



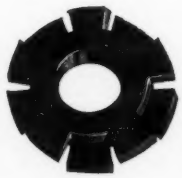
JOY 14-BU LOADER
A high capacity low vein machine . . . only 26" high . . . 5 tons per minute.

Agriculture today is no longer the leisurely industry it once was—America's profitable farms are mechanized to a high degree—the farm hand of yesterday is the farm-mechanic of today—

Coal Mining, too, has found that the true answer to fast, profitable operation lies in mechanization. We will be glad to confer with you.



JOY MANUFACTURING CO., FRANKLIN, PA.



★ This reversible Manganese Steel Shredder Ring is a patented feature found only in American Rolling Ring Crushers. It splits the coal instead of crushing it, thereby assuring a uniform size of crushed coal. An adjustable grinding plate makes it possible to secure properly sized coal for either stoker or pulverized coal burning. The crusher can be adjusted to make either a maximum or minimum amount of fines.

PRODUCING STOKER COAL SIZES IS OUR JOB . . .

QUICK FACTS ABOUT AMERICAN RING CRUSHER'S MONEY SAVING ABILITY

- Because fines are reduced to a minimum by the action of our patented Manganese Steel Shredder Rings—which *split* the coal instead of crushing it.
- Because power requirements are reduced by this splitting action to a remarkably low figure. American Ring Crushers can be relied upon to reduce bituminous coal from lump to stoker size for less than one cent per ton, *including all costs.*
- The American Rolling Ring Crusher embodies a number of original features in its operating mechanism, which makes it the outstanding Coal Crusher. Simplicity and accessibility were the guiding factors in the American Ring design. These crushers are built in various sizes and types.
- Find out how you can use it and save more money. Write us regarding your coal sizing problems. Our engineers will be glad to tell you the complete facts about this crusher and how its engineering features work to your benefit. Names and addresses of many prominent users furnished promptly on request.

AMERICAN RING COAL CRUSHERS NOT ONLY HANDLE ALL COAL SIZES *but*

when it comes down to 1" or minus domestic stoker coal, American Ring Crushers will do the best job on the basis that it will produce less dust or fines.

READ WHAT USERS SAY

ILLINOIS COAL OPERATOR:

"We are happy to state that the two units we have in service are performing satisfactorily. We have an old American Ring No. 30 which is still in use crushing gob and refuse, a new type A. C. 3-A used for making domestic stoker coal, and also a laboratory crusher."

MIDLAND ELECTRIC COAL CORPORATION:

"It has proved an economical and flexible unit. We have been able, by adjustments to vary the product from 35% minus ¼ inch to 14% minus ¼ inch, in a 1¼ inch crushed coal."

ANOTHER ILLINOIS PRODUCER:

"We are using two of your AC3-A American Rolling Ring Coal Crushers for producing domestic stoker product. These two Crushers, at different mines, are crushing 2 x 1" and 1½ x ¾" to a product ¾" and under at the rate of approximately 235 t. p. h., and also reducing 2 x 5/16" to a product 5/16" and under at the rate of 150 t. p. h. They are driven by 125-HP. motors. These crushers are more than fulfilling our expectations both in tonnage produced and in quality results in crushing to size. As a good capital investment they have our full endorsement."

AMERICAN PULVERIZER COMPANY

1019 MACKLIND AVENUE
ST. LOUIS, MISSOURI

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

THE NATION'S MINES ARE REMEMBERING PEARL HARBOR

Armed with a grim determination, the open pit coal, copper and iron mines of the Nation have mustered their man and machine power in an all-out war effort. A powerful influence on the final results are the hundreds of MARIONS actively engaged in digging and loading these vital materials. Maximum yardage is Marion's way of saying, "VICTORY will be ours."

THE MARION STEAM SHOVEL COMPANY
MARION, OHIO, U. S. A. ***Offices in all principal cities***
Serving industry since 1884

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SHOVELS • DRAGLINES • CLAMSHELLS
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Gasoline — Diesel — Electric — ¾ cubic yard to 35 cubic yards

TODAY'S TOUGH JOBS CALL FOR TRI-CLAD MOTORS

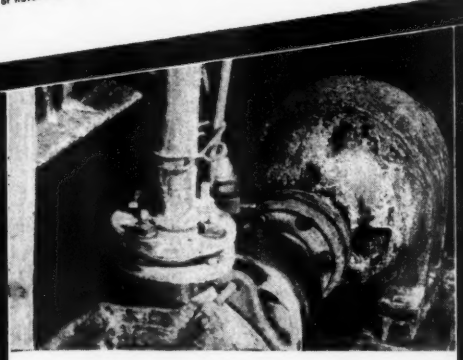
REG. U.S. PAT. OFF.

TODAY, you must be sure the motors you buy will give you 24-hour operation, even on the *tough* jobs. Here's where the Tri-Clad motor becomes a real asset. Its cast-iron frame and end shields are a safe-guard against accidental blows. The stator winding is protected against damage from oil, moisture, and heat shock. Improved bearings are enclosed in cast iron, protected against the entry of dust or dirt. Ask your G-E representative for details on types and sizes now available, or write General Electric Company, Schenectady, N. Y.

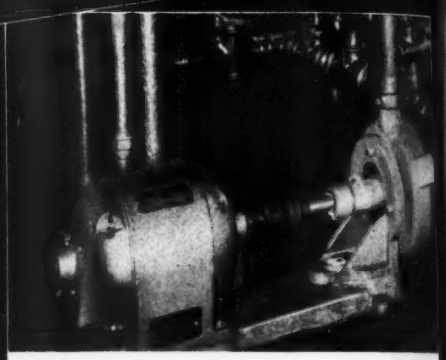
Now available up to 100 HP in standard, open construction

General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.

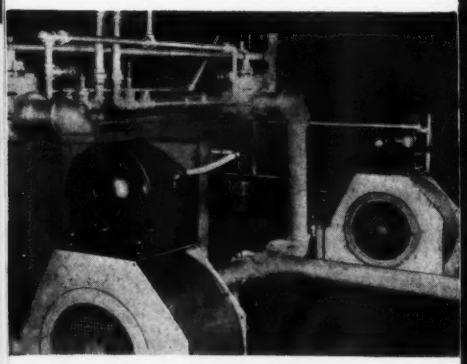
BIG JOB On machines vital to the war effort, Tri-Clad motors are well guarded by their cast-iron frames from metal chips or dripping coolants.



DIRTY JOB Note how dust and fumes have coated this Tri-Clad ball-bearing motor. This is service for which we might not recommend open motors, such as that shown, but we are glad to chalk up this instance of motor stamina under severe operating conditions.

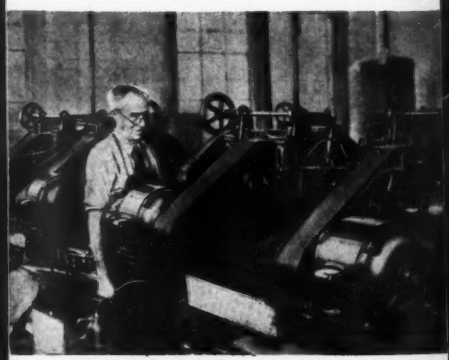


WET JOB Here's a Tri-Clad splash-proof motor close to the floor. Special end shields, watertight conduit boxes, and Formex wire give it *extra* protection against moisture.



HOT JOB These stoker motors are down where red-faced firemen used to sweat. Double-end ventilation and Formex windings with high-heat-transfer advantages give it *extra* protection needed for this service.

HEAVY JOB This Tri-Clad motor is installed on a lift bridge. In these surroundings where grease and grime are ever present, a protective frame is an important factor in continuous operation.

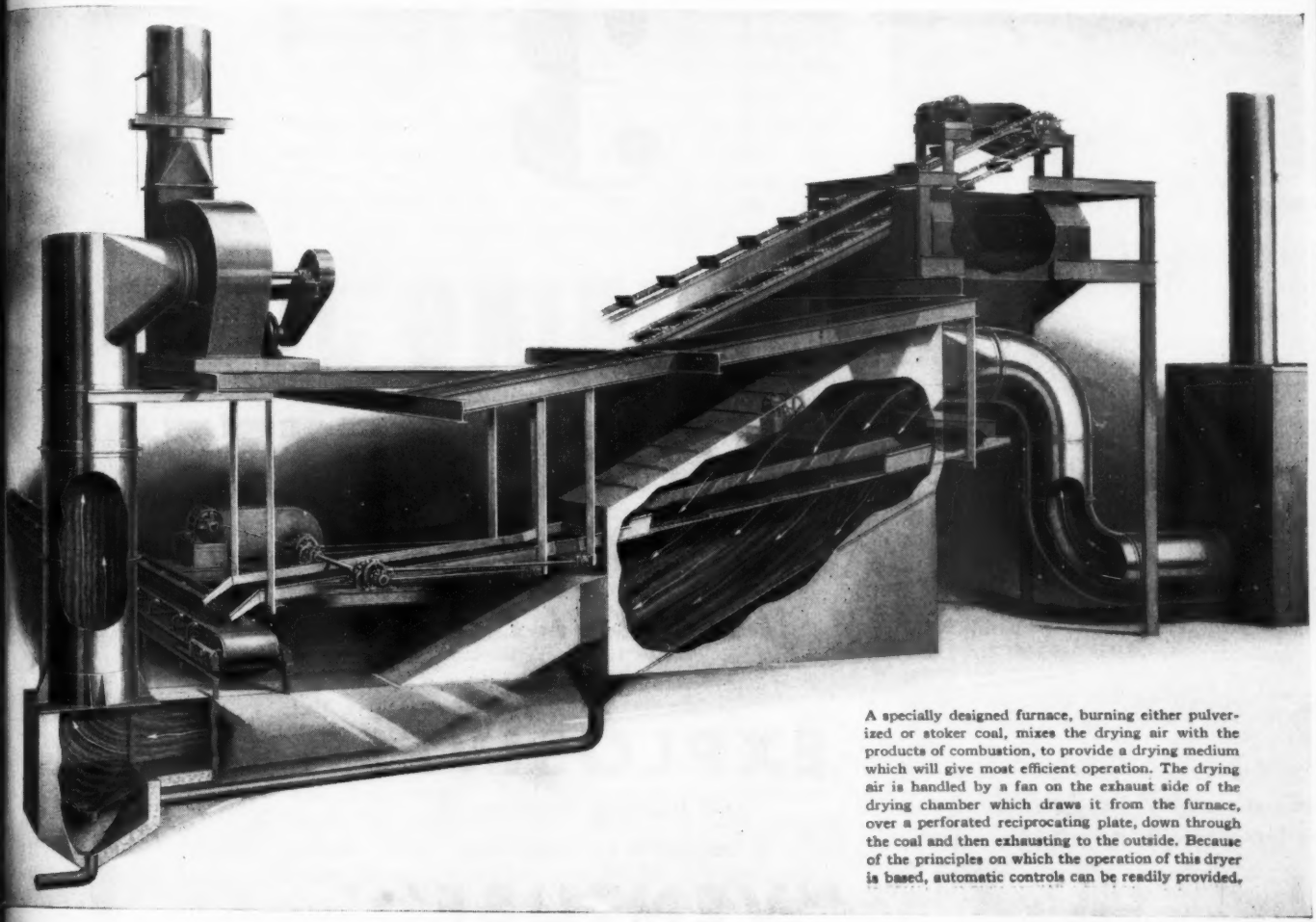


RUSH JOB Here's a Tri-Clad motor at work in the arms industry. The many features of Tri-Clad motors can not only help plants to get important tools into production quickly but will also help keep them in triple-shift operation.

GENERAL ELECTRIC

750-115-8058

LINK-BELT Announces The New "SS" DRYER



A specially designed furnace, burning either pulverized or stoker coal, mixes the drying air with the products of combustion, to provide a drying medium which will give most efficient operation. The drying air is handled by a fan on the exhaust side of the drying chamber which draws it from the furnace, over a perforated reciprocating plate, down through the coal and then exhausting to the outside. Because of the principles on which the operation of this dryer is based, automatic controls can be readily provided.

A Modern, Low-Cost, Effective Dryer for Removing Surface Moisture from Sized Coal

Here it is—A new, highly successful, safe, sure, low-cost method of drying coal, 10-mesh and up. It will give you everything an operator could ask for . . high capacity . . thorough, uniform drying . . low power consumption . . minimum maintenance.

Coal is passed through the drying chamber in a thin bed, requiring a short retention period, with low temperatures and low static resistance to the drying air. The screen plates which are oscillated, agitate the coal as it passes through the drying chamber, thus completely exposing its entire surface to the heat. This results in—

—Low temperature requirements for inlet gases and low static pressure at the exhaust fan.

—Thorough, uniform drying and a relatively cool discharged product.

LINK-BELT COMPANY

Chicago, Philadelphia, Pittsburgh, Wilkes-Barre, Huntington, W. Va., Denver, Kansas City, Mo., Cleveland, Indianapolis, Detroit, St. Louis, Seattle, Toronto, Vancouver.

5625

ONE OF A SERIES *of advertisements designed to keep you posted on du Pont products and services.*

3

COAL MINING JOBS YOU CAN DO BETTER

with du Pont

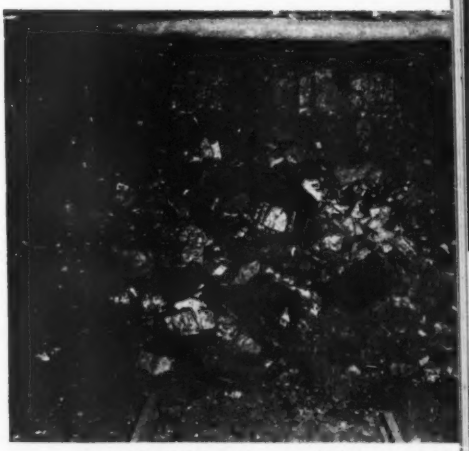
EXPLOSIVES
and Blasting Accessories

"VENTUBE"*
Ventilating Duct

Chromated Zinc Chloride
Treated Ties and Timber

1 **INCREASED PRODUCTION THROUGH BETTER BLASTING** — "Speed production and hold down costs" — that's the order of the day in coal operations throughout the country and it's the kind of a job "Du Pont Lump Coal C"† does best. Consider these four big advantages: (1) "Lump Coal C," because of its ultra-slow heaving action, rolls the coal forward, *away from the face,* so that mechanical loaders get it easily. (2) It shears ribs clean. (3) Its great spreading action frequently cuts down on the number of drill holes per face — saving time and explosives, and (4) "Lump Coal C" pulls a maximum of big, solid lump — the kind that enables you to load more tons per shift.

"Lump Coal C" *is* the answer to higher speed, higher quality coal production, at lower costs. If you're after "all out" production, it will pay you to consult your du Pont representative today. He has the permissibles and the experience to help you do the job. †*Reg. U.S. Pat. Off.*



LUMP COAL C permissible explosiv

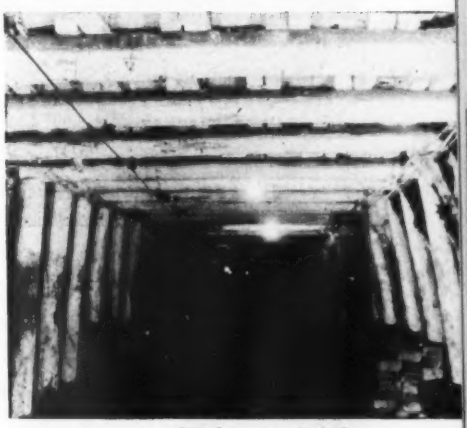
2 **VENTILATION THAT'S RAPID AND SAFE** — Continuous operation is the most essential factor in any conveyor installation. That's why more and more operators are using "Ventube" for increased efficiency through clearing face immediately after shooting. It assures the necessary velocity of air required, which cannot be obtained with any other means of clearing face.

"Ventube" is easy to handle and can be kept close to the rib where it will not interfere with operation of mechanical equipment or be torn down. It is easy to remove and install in new working places. It is resistant to flying rock and coal.

Try a few sections of "Ventube" in your toughest working. See how efficiently it works — how it helps you speed-up work and cut costs. Facts and figures will gladly be sent on request.

VENTUBE ventilating duct

3 **TIES AND TIMBER THAT CUT COSTS, AVOID DELAYS** — Mine ties treated with "Chromated Zinc Chloride" usually last for fifteen years instead of only two for ordinary wood. CZC makes the difference. Ties and timber treated with this preservative are resistant to decay, fire retardant, clean, odorless and safe to handle. Treated timber cuts costs, avoids delays to haulage-way traffic, reduces accidents, helps you speed production. Write today for your copy of "Wood Preservation for Mines" and for location of the nearest treaters.



CZC treated timber

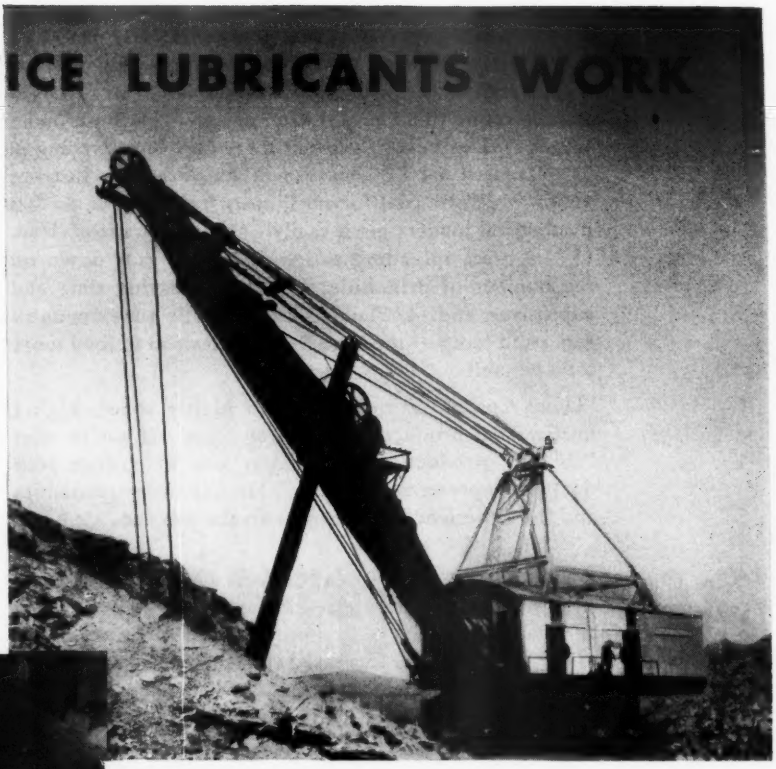
**"Ventube" is Du Pont's registered trademark for its rubber impregnated flexible ventilating duct.*

DU PONT
REG. U.S. PAT. OFF.

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
Wilmington, Delaware

CITIES SERVICE LUBRICANTS WORK

ABOVE and BELOW GROUND



ABOVE YOU SEE one of the hardest-working machines in the world — a great Marion Stripper of the Hanna Coal Company at Georgetown No. 12. Over at the left is another hard worker — a Whaley "Automatic" Loading Machine at Willow Grove No. 10.

Both use Cities Service Trojan Lubricants . . . and there's a reason. Tough, tenacious, long-lasting Trojan Lubricants keep operating costs *down* and profits *up*. They stick to their job of fighting friction in any weather, under the most exacting operating conditions. They'll help give your equipment an extra year of youth !

CITIES SERVICE TROJAN LUBRICANTS

Cities Service Trojan Lubricants were developed to fulfill a definite need. They're made to "stay put" and provide lubrication to friction surfaces under adverse conditions, sealing out dirt and moisture.

OIL IS AMMUNITION — USE IT WISELY!

CITIES SERVICE OILS
ONCE-ALWAYS

Write to —
CITIES SERVICE OIL COMPANY
Room 1326, Sixty Wall Tower, N. Y.
or any of the following offices:
CHICAGO . CLEVELAND . ST. PAUL
KANSAS CITY . BOSTON
or to
ARKANSAS FUEL OIL COMPANY
SHREVEPORT . ATLANTA . BIRMINGHAM

Cities Service coal mine lubricants include:

Car Journal Oils	Loader Grease
Cable Grease	Plant and Shop Machinery Oils
Compressor Oils	Steam Cylinder Oils
Cutting Oils	Mine Car Lubricants
Pressure Gun Grease	Turbine Oils
Diesel Engine Oils	Electric Motor Oils, Etc.

A LUBRICANT FOR EVERY INDUSTRIAL NEED

In this 100-year mine . . .

AR-MOORED TIES

solve another unusual track problem

Temporary expedients generally mean permanent expense . . . but not on this installation at the Glen Burn Mine of Susquehanna Collieries Co. Ar-Moored Ties—designed primarily for temporary track—helped the engineers to solve a permanent track problem created by rail shortages.

This mine has a one-hundred year life. When the outside tracks were rebuilt in 1941, the desired rail was not available, and second-hand material with a short estimated life had to be substituted. Future replacement would ordinarily mean considerable expense, and leave the ties weakened both mechanically and in their resistance to decay. The engineers used Ar-Moored Ties. Replacement of rail requires only the loosening of the clip bolts, and will not impair tie serviceability in any way.

Material shortages and mechanization have brought track problems to many mines where none existed before. The cost of track delays has been multiplied many times, in dollars and in lost production. You will find Ar-Moored Ties a practical solution, and a sound investment. Ask for literature, giving the facts.

WOOD PRESERVING DIVISION
KOPPERS COMPANY
PITTSBURGH • PENNSYLVANIA

use KOPPERS products

MANASITE—the Detonator of Tomorrow—Available Today

Greater Safety *plus* Dependable Performance

Helps to Increase Production

Safety, today, is more vital than ever. Every accident means an irreplaceable loss not only of man-hours but of machine-hours—a serious cut in the effectiveness of the country's production equipment.

Inadvertent mishandling of explosives and detonators is more probable today—both because of the many new men being put on, and because of the rush for production.

By helping to avoid such accidents, Atlas Manasite Detonators are doing their part to increase production.

Atlas Manasite is the result of years of experience in making blasting caps. Before Manasite was introduced, Atlas made hundreds of millions of detonators—good detonators, as reliable and as relatively safe as any produced at the time. Then, through chemical research, Atlas changed the blasting-cap picture. With Manasite, an exclusive method of manufacture—plus the use of hexanitromannite as a detonating agent—substantially increased the margin of safety. While no blasting cap can be called "safe," Atlas Manasite Detonators make safety precautions more effective than ever.

Today, with increased production a "must," can you afford to overlook this advance in safer blasting?

MANASITE—Reg. U. S. Pat. Off.

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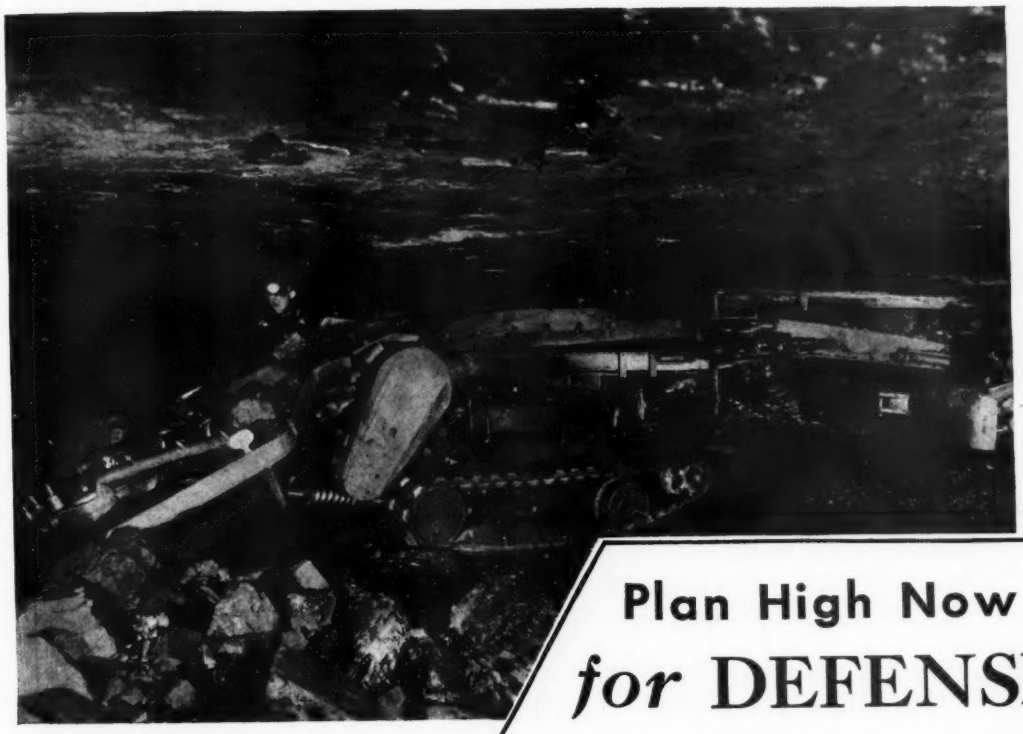

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When mine operators plan for Coal Production these days, they're planning *high* with SKF-equipped machines. With this Joy 7-BU Loader, for instance, there are no stops for bearing trouble . . . no delays for fussy bearing adjustments . . . no time out for bearing repairs. Always there's smooth, continuous performance that enables you, as a mine operator, to get MORE done in *less time at less cost.* That's the real secret of Production these days, isn't it?

4948

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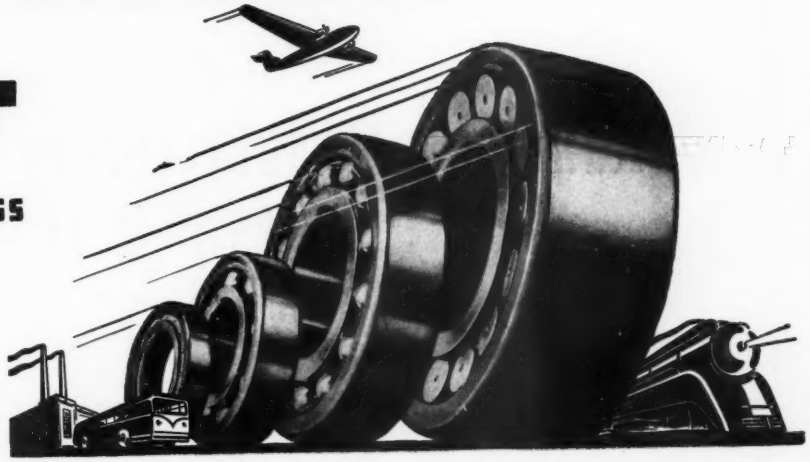

An Acknowledgment

THESE Things Have Come To Us During The Past Forty Years:

1. **MORE THAN FIFTEEN MILLION HOURS OF WORK.**
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3. **THE SATISFACTION WHICH COMES WITH THE PRODUCTION OF USEFUL THINGS.**
4. **A MEASURE OF SUCCESSFUL PROGRESS.**
5. **A SHARE IN MAKING A VITAL PRODUCT AVAILABLE TO MANY INDUSTRIES AND TO MANY PEOPLE.**
6. **AN OPPORTUNITY TO CONTRIBUTE TO THE NATIONAL WEALTH AND THE AMERICAN WAY.**

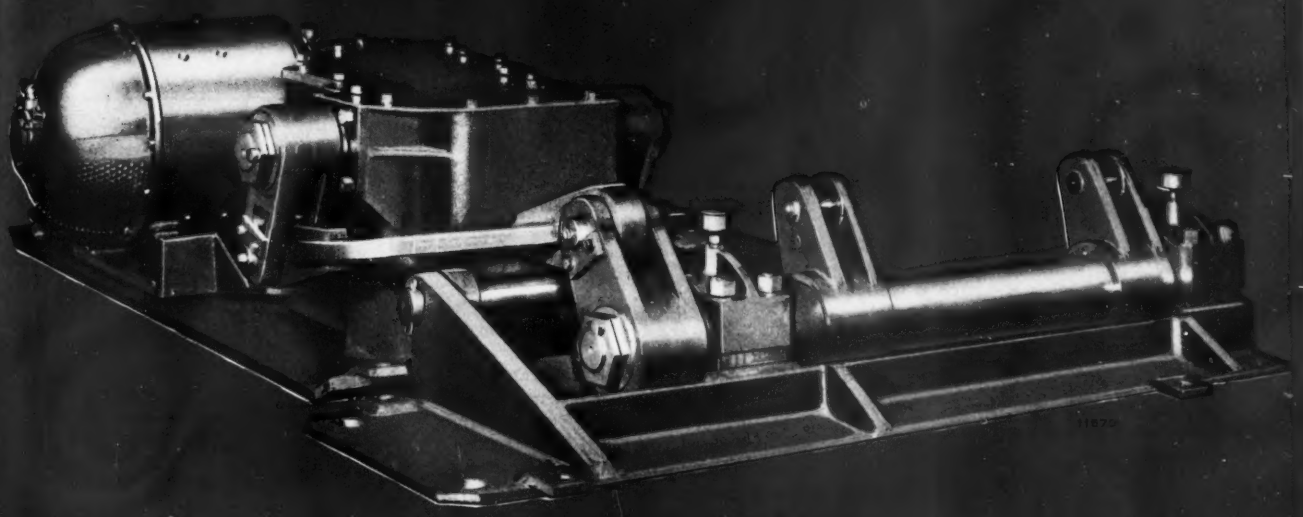
They have come to us because the **COAL INDUSTRY** has had need of the things we can make and the things we can do.

IT IS A GREAT INDUSTRY - RESPECT IT

Kanawha Manufacturing Company
CHARLESTON, W. VA.

1902 - Fortieth Year - 1942

Goodman Shaker Conveyors In Low Coal



The new axial drive unit developed by Goodman for shaker conveyors permits the profitable use of this high capacity equipment in low coal.

Maximum output of mine is a steel and Fibreflex Factor in the known area of the United Nations. Thousands of tons of COAL and METALS are produced daily with Goodman mining machinery.

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"You strand together 19 wires, and in between you weave the thread of Research"

Like the research that's responsible for this giant strander

"Many a job calls for 6 x 19 "Blue Center" Steel Wire Rope, but for those that don't, Roebling Research is ready with specialized facilities and materials. This giant strander, for example, can take as many as 46 tough steel wires, and accurately lay them into strand for pliable, high-strength, large diameter ropes, such as are used on mammoth dredges . . .

How strong is such a strand? If we want to know, this "tower of torture" will tell us. Another of the long arms of Roebling Research, it can pull apart a 4" wire rope to find its ultimate breaking strength. It also indicates how the rope will behave under *your* conditions and *your* loads . . .

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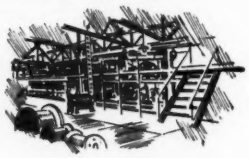


Thus the strong but invisible thread of Research is woven into every inch of Roebling "Blue Center" Steel Wire Rope. Giving it the extra stamina to meet the unusual load as well as the routine one . . . to give extra service where extra service is called for. Bringing it to the high standards it must pass, to carry the Roebling Trademark . . ."

JR ROEBLING

Roebling Research, Roebling Engineering, Roebling Plant Facilities and broad Experience . . . each adds its part to the extra values in Roebling "Blue Center" Rope. Each helps it meet conditions unfailingly, wherever wire rope has a routine or unusual job to do.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches and Warehouses in Principal Cities

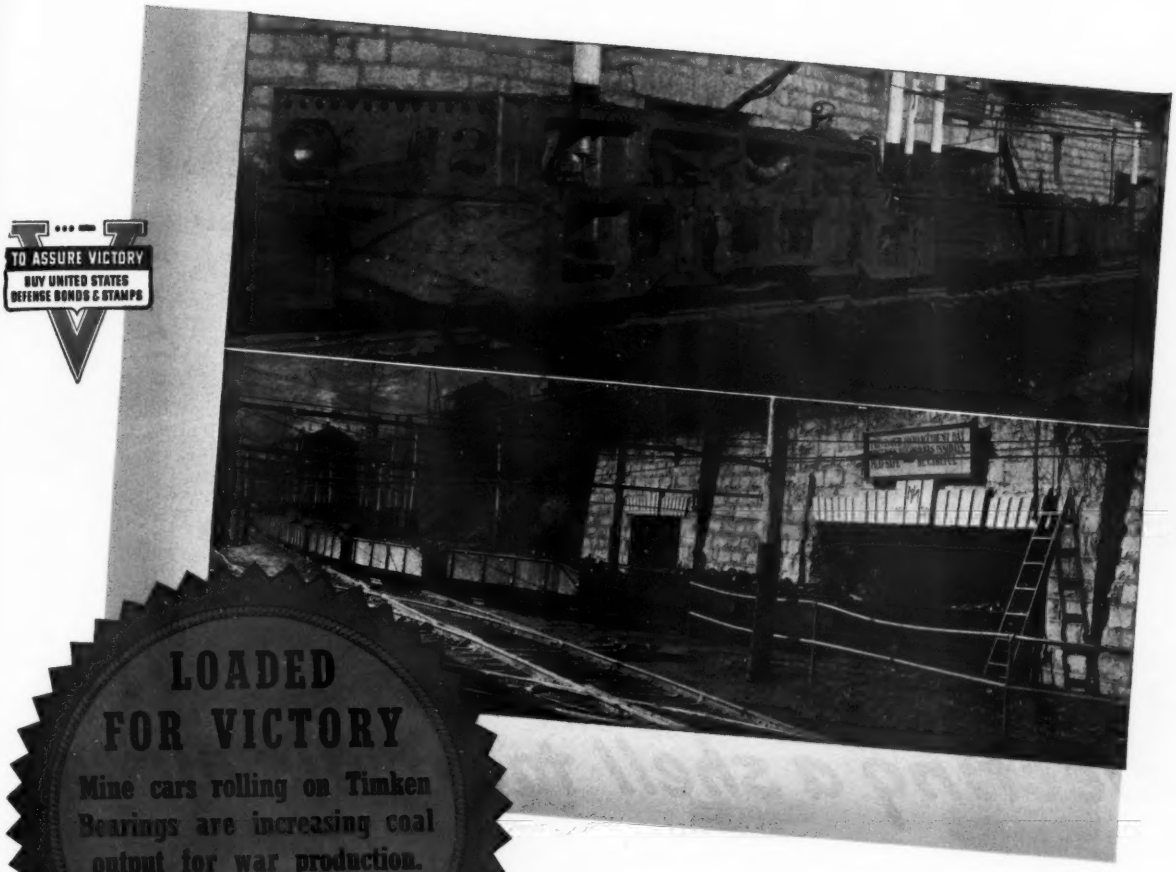
THAT'S THE ONLY WAY TO MAKE

ROEBLING

"Blue Center"

STEEL WIRE ROPE

PREFORMED OR NON-PREFORMED



TO ASSURE VICTORY
BUY UNITED STATES DEFENSE BONDS & STAMPS

LOADED FOR VICTORY

Mine cars rolling on Timken Bearings are increasing coal output for war production. They will help to assure economic stability after Victory.

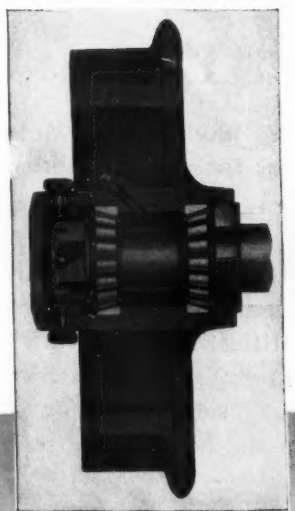
The mine cars and locomotive shown above are in operation at the Nellis, West Va., mine of the American Rolling Mill Company.

There are 160 of these large capacity (5 tons) modern all-steel cars in service and 60 more on order. All are equipped with Timken Tapered Roller Bearings.

The electric locomotive is a 20-ton Westinghouse. It has Timken Bearings in all journal boxes and also on the motor armature shaft.

"If you want to make 'em roll," says this operator, "specify Timken Bearings for all mining equipment." That's a good tip to remember now and in the future.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO



Standard Timken Bearing mine car wheel application.

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

"S s-sh-h-h, Sir! Captain Clunk is selecting a shell to fit his mood"

Luckily, the armed forces of this nation aren't run that way. But suppose the crews of our anti-aircraft guns *were* supplied with a variety of shapes and sizes of shells. And suppose the battery commanders *did* follow their whims in selecting ammunition. There'd be h--l to pay, wouldn't there?

That's why individualism, personal preferences and prejudices in time of war have to go!

America is a nation of individualists. That's one of the reasons you and I are Americans—we like the democratic way of living and we like being individualists. But there comes a time when even the most confirmed individualist must choose between survival and individualism. And survival comes first!

How does that affect your job and ours? It means we must standardize—standardize our production routines — standardize our purchases — and standardize our manufacture. For standardization is the most effective tool we have for making our wartime production count!

And Here's How You Can Make All Our Jobs Easier, More Efficient

Standardize on one type of hanger, clamp, rail bond, etc., to do the job in your mine. (If possible, select your standard item from the adjacent selection.) Order in convenient shipping quantities. By doing this you'll enable us to streamline our manufacturing processes and you'll simplify your own installation, stocking and bookkeeping problems.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

We recommend

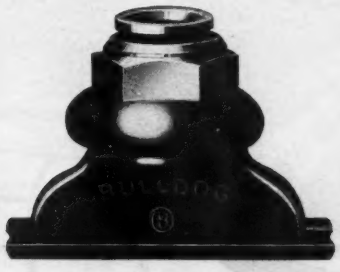
THESE O-B PERFORMANCE-PROVED PRODUCTS TO YOU

Universal-2 Hanger

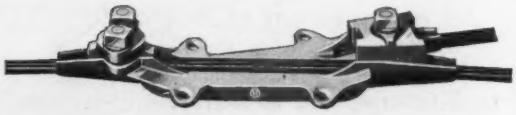
Type K-3 Hanger

Universal Trolley Wire Splicer

Type D Trolley Frog



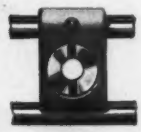
Bulldog Trolley Clamp



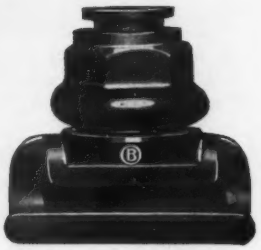
Type PC Trolley Frog

Type A-3
Expansion Bolt

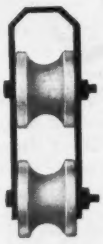
Bulldog
Dual Clamp



Mine Catenary Clamp

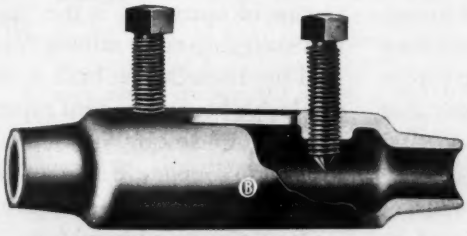


Bulldog Feeder Sling

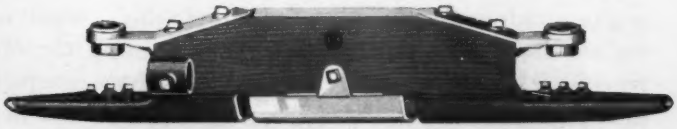


Type C Feeder Wire Insulator

Type M-6 Section Insulator Switch



Feeder Wire Splicer



Metal Underrun Section Insulator

OHIO B BRASS

MANSFIELD OHIO · U · S · A

Canadian Ohio Brass Company, Ltd. Niagara Falls, Ont., Canada

2295M

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This tail wags the "dog"

An achievement of Anaconda research aiding both our war effort and our industry.

MINES . . . one of the necessities of our gigantic war effort . . . today rumble with the noise of *work*. To keep this rumbling rhythm steady and incessant, mining machines and transportation systems use large quantities of electrical power.

Here, a bustling locomotive carries its electrical power around with it . . . like a tail. Over sharp-edged rails, thumping over shaggy, splintered ties, reeling and unreeling as the locomotive moves back and forth, the "tail" . . . the copper power cable . . . stands up day after day delivering the ever-so-vital power without interruption.

Sunex Securityflex*, a product of Anaconda research developed to withstand not only the rough and tumble conditions of underground mining but also the sun blistering service of open pits, is the "tail" that's wagging many mining dogs. And the research that built it, the invaluable hours of patient experimenting and testing, now speeds to develop copper wires and cables for an even more potent war effort . . . for a greater industrial front . . . for use in mines, in war-vital plants, in bombers and battleships. 42243

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A JOURNAL FOR THE ENTIRE MINING INDUSTRY—PUBLISHED BY THE AMERICAN MINING CONGRESS

MINING CONGRESS JOURNAL

HARRY C. CHELLSON
Editor

Vol. 28 APRIL, 1942 No. 4

P-56 AND WESTERN MINING

EARLY in March, Order P-56, under which our mines had had a blanket A-3 rating for purchase of equipment and supplies, was again amended. Higher ratings were provided, and the A-1-a rating for emergency breakdowns together with an A-1-c for current repairs were made extendible by the manufacturer to the supplier of materials. The front rank position of mining in our war economy was again recognized.

At the same time, benefits of the order were denied to gold and silver mines, which were relegated to an A-10 rating under Order P-100. Not only that, but any mine in which 30 percent or more of the value consists of gold and silver, was to have its serial number withdrawn.

A wave of protest arose from the western states against this arbitrary 30 percent limitation. Scores of mines having important production of copper, lead, zinc or strategic metals were apparently to be barred from full priority assistance, due solely to their good fortune in having minute quantities of precious metals which help pay the cost of producing the needed war metals. Likewise, fluxing ores needed by lead and copper smelters were on the face of the order, to be cut off from its benefits. Many communities wholly dependent on mining operations were bound to suffer severely under such conditions.

Urgent requests to restore the blanket priority status were made to WPB's Mining Branch Administrator. The War Production Board has not seen fit to grant such requests in full, and many straight gold producers, despite the smallness of their material requirements, apparently face harder sledding from here on out. On the other hand, relief is being extended in many instances as the following telegram from Dr. Wilbur Nelson attests:

> "No mines producing amounts of copper, lead or zinc needed in our war effort, irrespective of the amount of gold and silver such ores carry, will be denied priority ratings under P-56. No siliceous ore necessary in smelting operations will be denied priority ratings under P-56. Serial numbers of mines of this type are being reinstated at the present time."

At this writing the serial numbers of approximately one hundred mines have been reinstated, and consideration is being given to other cases in which individual applications are made. Regardless of one's opinion as to this method of handling the matter, our nation's interest in continued production of metals for war is so great that it behooves every mine operator who can qualify for reinstatement, and every State Mining Coordinator, to present all possible facts to the Mining Branch on the basis of which continued priority assistance to the mines may be provided. (*See also pages 70 and 77*).

SILVER—A GOOD PINCH HITTER

AS THE war effort swings into high gear it demands more metal. An all-time record in iron ore shipments must be had this year to produce the necessary weapons of offense and defense. Copper, lead and zinc are being consumed in record-breaking volume each month and the so-called strategic metals are playing roles of incalculable importance. Even gold and silver have their uses in many highly specialized products for the chemical and other fields, as well as their recognized function in our currency.

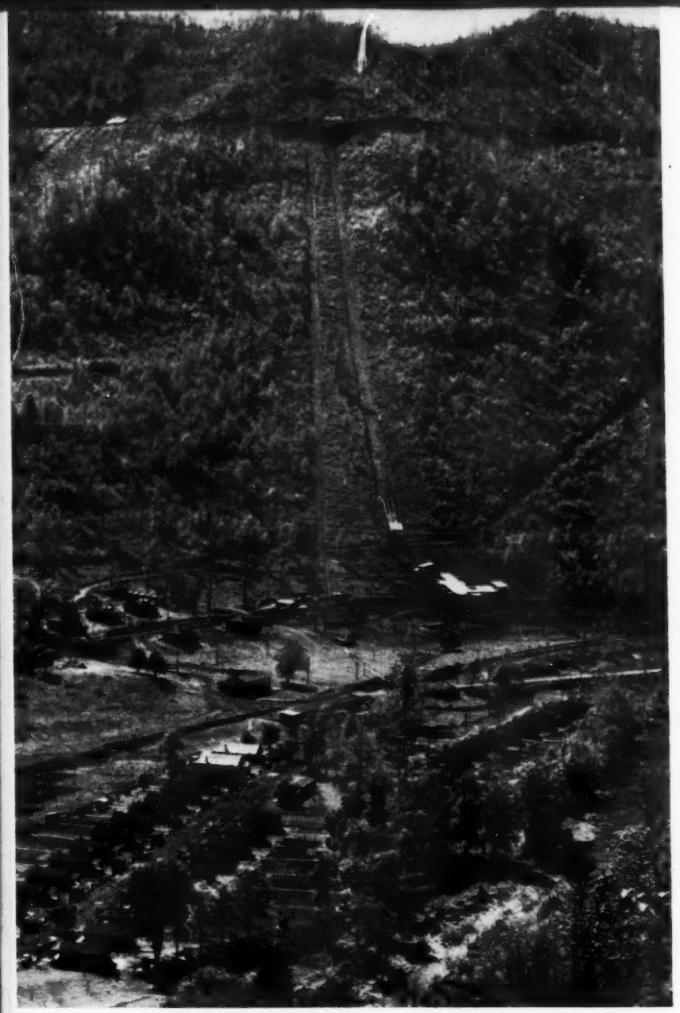
The War Production Board is seeking means to release more copper, tin and antimony for direct war application, and silver is earmarked for realistic uses. It is estimated that 41,000 tons of copper could go to war this year by the substitution of silver in low voltage, heavy current bus bar conductors in proposed government-owned and financed defense plants. About 19,000 tons could be reclaimed and replaced in privately-owned aluminum plants. In industrial plants and central power stations, it is estimated 20,000 tons of copper could be replaced by silver. Therefore, possibilities exist for liberating 80,000 tons of copper for direct war applications. Supplies of silver from Treasury stock for such purposes purposes cannot be released, however, until legal arrangements are worked out.

Completion of such a plan for silver would have its technical problems, but there are signs this spring that we may see silver playing a more exciting part in World War II.

WANTED—MANPOWER

A MAN between the ages of 20 and 65 employed in the mining industry or on the assembly line, be he helper, worker, operator or executive, takes serious counsel with himself as he stands upon a strange threshold of a changing world and ponders, "What can I do to help my country win this war?" Even though he may have a son already at war, and is buying bonds or stamps and doing some civilian defense duties or working hard, his thoughts reach out for something more concrete, such as the fulfillment of that ardent longing to take a crack at Hitler, or to drop tons of bombs on yellow Japanese militarists.

On April 27, 1942, millions of men between the ages of 45 and 65 will register for Selective Service with grim determination for Victory. Men who have filled out questionnaires and sent them to their respective draft boards may have an answer to the above question from the government this year. General Hershey, Selective Service Chief, has said on more than one occasion, that the armed forces are going to need men in ever-increasing numbers and that they are going to be taken regardless of dependency. He did, however, make the reservation that deferments may be granted where the positions held are necessary to war production. Each case is decided on its individual conditions and no blanket deferments will be given. Obviously, if the war is long, more manpower will be drawn upon. In the meantime, Uncle Sam suggests that you buy all the bonds you can afford, boost your production, and before long he will advise you if you are more valuable where you are or if you will get a chance to fulfill that ardent longing.



Incline and townsite at No. 2 plant

MECHANIZED MINING Under Difficult Seam Conditions

By C. W. THOMPSON
Superintendent
Pardee & Curtin Lumber Company
Barton, W. Va.

Few companies have had the combinations of low coal, steep grades, and bad top described by Mr. Thompson in this article, and he gives a very interesting story of perseverance in finding different types of loading equipment to meet these difficulties singly and in combination.

THE properties of the Pardee and Curtin Lumber Company are situated near the geographical center of West Virginia, in the vicinity of Webster Springs; there are at present three active mines, and the territory under development extends for a distance of about 15 miles along the waters of the Elk River. These mines are all operating the Sewell seam—a part of the well-known New River series—having a medium low volatile coal of low ash and sulphur content, which is especially adaptable for metallurgical, by-product, and steam purposes. As shown in the accompanying photograph, the seam is 1,000 ft. vertically above the Western Maryland Railroad along the river and an incline about 2,000 ft. long, lower the coal to the tipples. Modern screening plants have the usual installation of shakers, vibrators, and picking tables; mechanical cleaning has, fortunately, not yet been found necessary but the high quality of the coal is about our only consistent favorable condition, as the subsequent account of difficulties will reveal.

This field is one of the newest in the United States; the mines were opened in the late 1920's, but later developments have expanded and the Webster Springs area is now producing approximately 10,000 tons per day. The first operations were with hand loading, but about eight years ago it became evident that, due to varying seam conditions, hand loading was not economical for all sections of the mines and that some method of mechanization would have to be adopted. Early experiments, in 1933 and 1934, further developed the fact that, again because of varying conditions, there was probably no one class of loading equipment which would be economically adaptable to the field as a whole.

Numerous trials were made in an effort to standardize on some machine

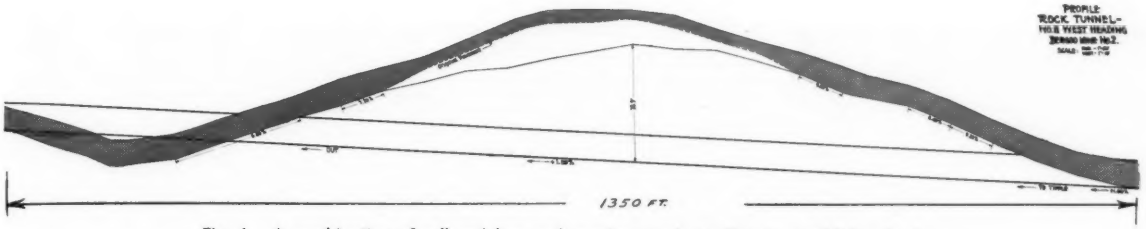


Fig. 1. A combination of roll and low coal requires much grading to establish a haulway

or method of mining; these included track-mounted and tractor-mounted mobile machines loading into mine cars and into conveyors of the chain and rope dragline types; hand-loaded conveyors in entries, rooms, and pillars with single and multiple units; dragline conveyors used with hand loading and also used as the room haulage units with hand-loaded face conveyors. In fact, everything that seemed to offer success was tried, but after experiments over some years it became obvious that different types of equipment must be selected to suit different conditions and, as changes occur quite abruptly, the equipment must be flexible and easily removable for interchange between different sections of the mine as the seam variations determine. This naturally has prevented extensive concentrated areas from being worked for any considerable period of time by any one particular method or type of loading machine.

Seam Conditions and Difficulties

The three principal difficulties existing on these properties are bad top, steep grades, and low coal. The roof immediately above the seam is a slate, varying from a few inches to several feet in thickness. In most cases this slate comes down very quickly, sometimes with the shot, and in other cases standing for a few minutes to a few days. No method of timbering has so far been found effective to keep this strata permanently in place, and we consider ourselves fortunate if the top will stand long enough to load out the coal.

Very severe grades are also typical in this area and abrupt raises and dips are always to be expected. These make a severe haulage problem and frequently require extensive grading for the main line and entry haulageways. Figure 1 illustrates a condition which, while of course not typical of the entire mine, is nevertheless representative of what frequently has occurred. It will be noted here that, in addition to the heavy grade, the coal seam thins out at the top of the raise so that some bottom had to be taken up while the entry was being driven. Later, when this entry became a main haulageway, a further cut of about 29 ft. was necessary to establish a uniform grade through this disturbed area. It goes without saying that the management had a high degree of optimism to cope with a situation like this.

Bad top, of course, occurs in many mines, probably as severe as in ours, and changing grades are also apt to be encountered in any seam. In these respects we are perhaps no worse off than many other companies, but we have still a third difficulty—changing seam heights—which is harder to con-

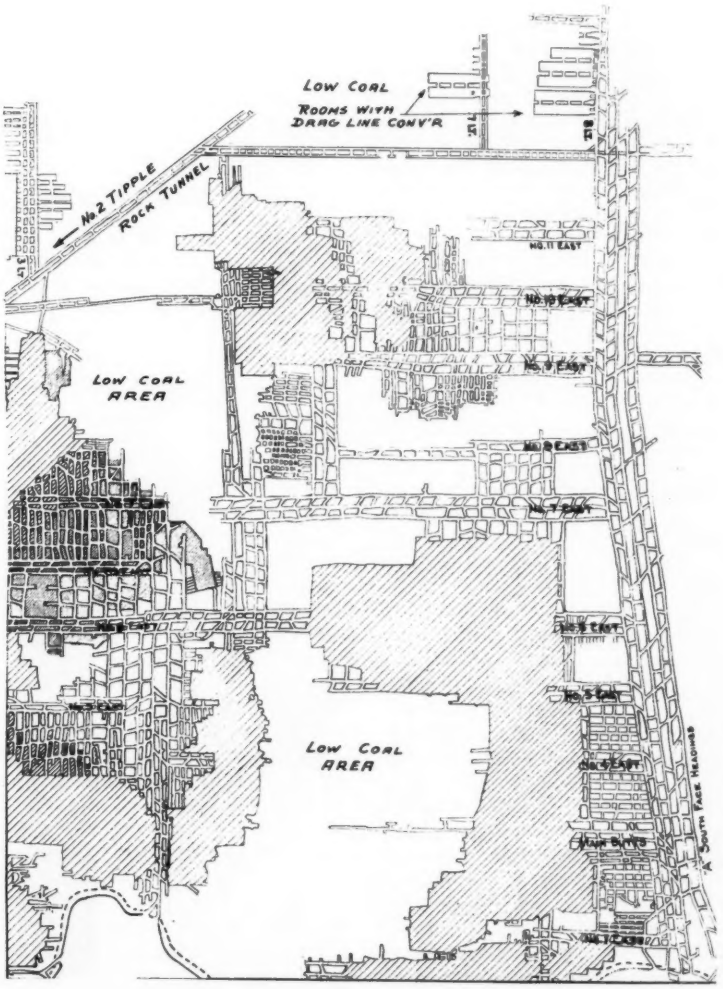


Fig. 2. Low coal areas interrupt regular plan of mining

tend with than either of the other two. When all three occur at the same time real grief is ahead, and a firm faith in the future is needed.

The Sewell seam in this field has the deserved reputation of being spotty and bears out the saying that "nothing is constant but change." Large areas are encountered where the coal will have a fairly uniform thickness—this may be anywhere from 42 to 60 in., but there is no assurance as to how long this uniformity will continue. For example, in our mines Nos. 3 and 4, as will be briefly described in subsequent paragraphs, the mining conditions are, on the whole, rather favorable, but in No. 2 mine the seam irregularities occur more frequently and closely adjoining sections may require entirely dissimilar methods of operation.

Low Coal and Heavy Grades

Figure 2, which is a part of No. 2 mine map, shows how these low coal areas have affected the development and the situation illustrated here is fairly typical of this particular section of our property. The main entries of our No. 1 mine, one of the earliest operations in this field, are marked "A" South Face Heading on the map; these started in (what we call) high coal but, as shown on the map, the workings to the left soon encountered low coal which could not be mined by hand loading. After driving beyond this first thin seam area a similar condition was subsequently encountered which again prohibited hand mining, and soon after that the main entries themselves ran into low coal and were stopped.

In the meanwhile No. 2 mine had been opened a short distance up the river and, as the future territory of No. 1 mine could be reached from this new operation, the development at No. 1 was discontinued and the mine was later shut down. About that time, 1933-34, experiments were started to determine a method of mechanizing which could work these low coal areas economically.

Before discussing these methods, a further reference to Figure 2 shows the entry marked "rock tunnel" which was driven from No. 2 mine within the last year or so. This cuts into the abandoned territory ahead of No. 1, and some of the difficulties met with in this section are illustrated by the profile in Figure 1, which was taken in the tunnel heading. The entry development was driven partly with hand-loaded chain conveyors and partly with dragline conveyors, but the present mining in this section is with hand-loaded dragline conveyors in wide rooms, as shown near the top of Figure 2 and described later in detail.

Mechanized Mining at No. 2

As mentioned previously in this article, it has not been possible for us to select any one type of equipment which is adaptable for all of the various conditions encountered and, in our experience at No. 2 mine over the past eight years, many steps have been taken in developing economical methods of mechanical operation. In this connection it should be remembered that practically all of our mechanized sections have conditions prohibitive for hand loading, so in effect we were really hunting for trouble. People who do that usually find what they seek.

Our first mechanized experiments were with a low-height track-mounted loading machine, and while this has some degree of success within itself, we soon discovered there was not a sufficient area of coal suitable for this type of operation to justify additional similar equipment. Another difficulty with the track-mounted mobile loaders was our small mine-car capacity, and in order to overcome this we now have in one section of No. 2 mine two Joy machines loading onto Jeffrey chain conveyors. Each of these machines operates a unit of two rooms and the two machines are working to the right and left off of the same entry. This operation has proven satisfactory and is expected to continue as long as the seam in that section remains constant.

Hand-loaded conveyors have also been tried quite extensively in single and multiple units and, here again, these operations were satisfactory where conditions were favorable. However, bad top was frequently encountered which required close timbering along the face; in such places, when bringing the face conveyors forward, the pans had to be disconnected, as it was too dangerous to move and reset the face timbers. This involved too much time and labor.

Drag Line Conveyors

More than a year ago, in order to find a mining system that would work under a variety of conditions, we installed dragline conveyors. This particular type of equipment, manufactured by Enterprise Wheel and Car Corporation, is a modification of drag scrapers and consists of a large steel box operated by ropes and traveling from the face to a ramp in the entry, when it discharges into a trip of mine cars. The construction features have been described in previous publications and a more detailed account is not necessary here.

Our original idea of operating the dragline conveyors was to load the box with a mobile-loading machine. This gave some promise of success at the beginning but eventually was discontinued for several reasons. It was not practicable to use a box of much greater than 1-ton capacity, which involved a considerable time loss to

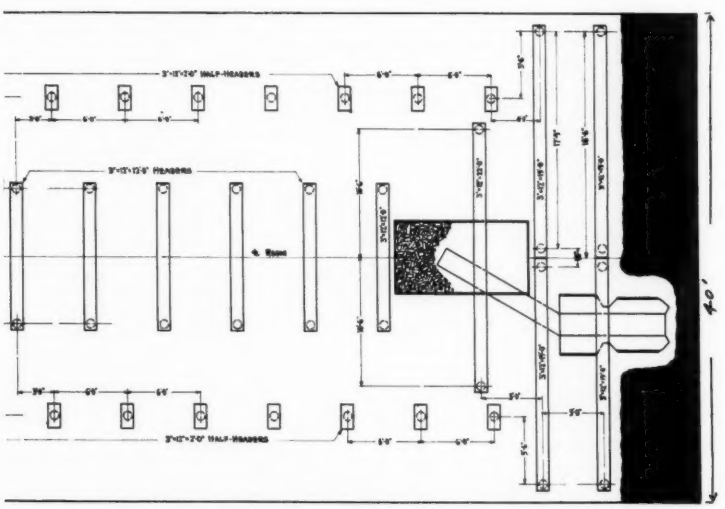


Fig. 3. Excessive timbering for bad roof caused discontinuance of mechanical loading into drag conveyor

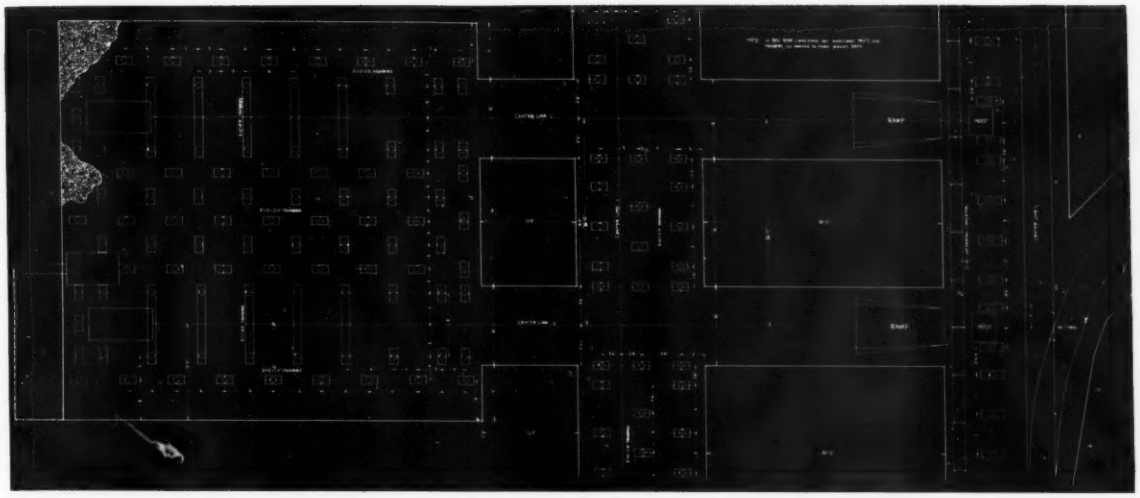


Fig. 4. Plan of mining and timbering for a working room with hand loaded drag conveyor

the loading machine (similar to mine-car changing) while the box was traveling between the room face and the entry. This, perhaps, might have been overcome, but bad top caused too many additional delays. As similarly experienced in some of our conveyor mining, close face timbering, as shown in Figure 3, interfered with the maneuvering of the loading machine; long headers and roof jacks had some effect in overcoming this trouble, but very often the top rock would come down with the coal, and when that happened there was much time lost in removing the slate.

To eliminate the objections to machine loading just described, we are now using hand-loaded drag conveyors, operating the system shown in Figure 4. Rooms are driven 50 ft. wide with two dragline conveyors one on each side of the room. These are so located, as shown by the sketch, that the entire 50-ft. room face is within hand-shoveling distance of one or the other boxes. This method has been able to mine our worst roofs and grades, but it does not have the efficiency to recommend it over other types of equipment where conditions are better.

As will be seen in Figure 4, extremely close timbering can be used, and with the exception of safety posts at the face of the coal, all other timbers can be set permanently as the room advances. One cutting machine serves the entire face, and this arrangement provides great flexibility for performing the various operations of cutting, drilling, timbering, etc. The whole crew works as a unit and men can change easily from one job to another as required during the shift. Our present plan works two rooms as a unit, with the dragline conveyors discharging onto a chain gathering conveyor laid in the entry.

Favorable Conditions at Nos. 3 and 4 Mines

The foregoing has been confined to describing troubles and difficulties but it is not the idea to give the impression that these irregularities and disturbances extend throughout our entire property. Actually, there are large areas where the seam is fairly regular and favorable for mining; this is evidenced by the fact that our company has been operating this field for nearly 15 years, that new mines have opened, equipment has been added, and our tonnage has increased. So the following brief descriptions of our No. 3 and No. 4 mines will serve as a happy ending to this story.

No. 3 mine, which is about 5 miles up the river from No. 2, has a rather regular condition, although unfortunately these are not altogether satisfactory. The coal is considered to be too low for mobile machines, so hand-loaded Jeffrey chain conveyors are used with a battery of four rooms, as an operating unit. The rooms are driven 35 ft. wide and 300 ft. long, with a 35-ft. room pillar that is recovered immediately after the room has reached its limit.

Each room has a face conveyor and the four room conveyors discharge onto a gathering conveyor, about 400 ft. long, located in the entry and loading into a trip of mine cars. All of this operation follows typical conveyor practices, the only unusual feature being the use of top-cutting Sullivan shortwall machines. At the top of the seam there is a bone strata, from 8 to 12 in. thick, which is "burnt" to the coal, and the machine cuts at the bottom of this bone, leaving the coal free for loading.

No. 4 mine, which is situated furthest up the river, has the best seam. While some irregularities occur, the coal height has been reasonably constant (for this particular field), and at this operation a Joy 14-B.U. loader with shuttle cars was recently installed. The results so far have been encouraging but the equipment has not been in operation long enough to provide any definite figures. There is nothing of special interest to describe here, as the usual shuttle-car methods are used in room-and-pillar mining; the shuttle discharging into an elevating conveyor which loads a trip of mine cars.

Conclusion

During the past eight years we have learned many things and, while "adversity is a hard teacher," our experience as a whole has been of great value to us. We have demonstrated that many conditions which are impossible for hand loading can be worked with some type of mechanization. This, however, is not all. Operating under difficulties has shown that the advantages and economies of machine methods can be applied to favorable areas, consequently the curve of mechanical production for all of our mines is now definitely upward and the trend of our company is toward complete mechanized loading.

High Voltage POWER DISTRIBUTION Underground

By A. L. LEE
Consulting Engineer
Pittsburgh, Pa.

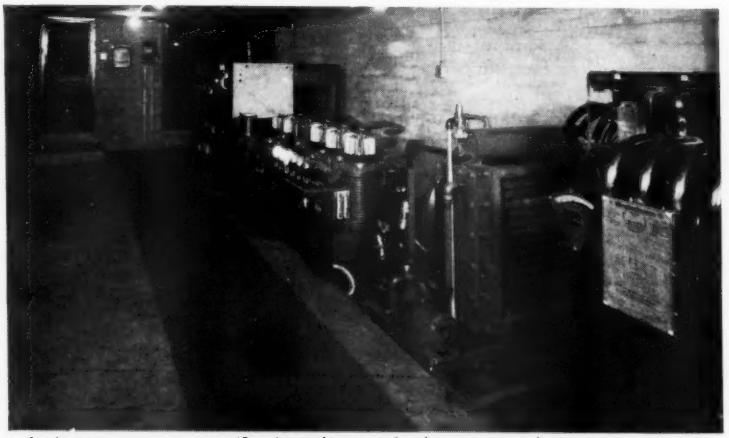
PROBLEMS associated with direct current power distribution in coal mines have been frequently and thoroughly discussed in recent years and many highly informative articles have been presented in the various trade publications. Most mining officials are quite aware of the desirability of providing a power supply which will serve their machine operations adequately and the many costly and demoralizing effects of so-called "poor power" are too well known to require repetition here. The job of maintaining a satisfactory standard with regard to face voltage conditions is one which seems to constantly demand greater attention as the machine reports of most coal operations will affirm.

Power demands of modern high capacity cutting and loading machines are such that sub-standard voltage conditions produce conditions bordering on the intolerable. This is particularly true in mines which use 250 volts d.c., of which there is a large majority. Since excessively large trailing cables cannot be properly handled and reeled, a considerable voltage drop in the cable must be expected where high capacity machines are used. In many cases cable voltage drop in cutting machine cables is in excess of 10 percent. Since as a general statement, a total voltage drop of 25 percent to 30 percent at the terminals of a mining machine motor will result in unsatisfactory production rates and associated difficulties, it becomes obvious that certain minimum standards of face power supply must be maintained for the efficient use of mining machinery.

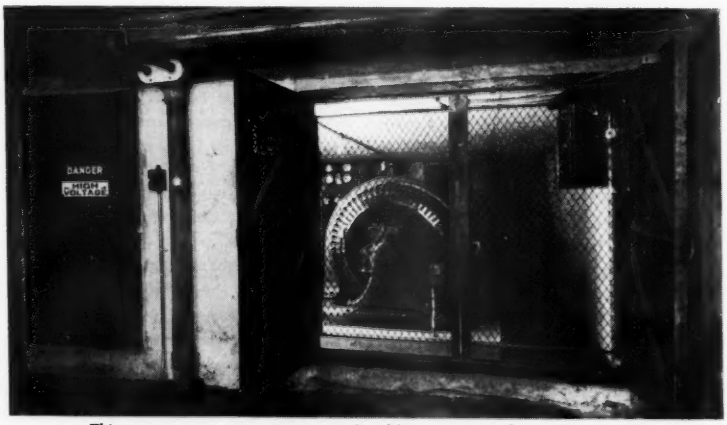
The foregoing remarks pertaining to direct current distribution have been made to emphasize the trend in the coal industry toward the use of more extensive alternating current systems and the installation of substation units adjacent to the working areas. Certainly the idea is by no means new as it has been found to be the only practical and economical sound method of eliminating the serious difficulties of maintaining a direct current system extending several miles in many cases from the supply generator.

Installation of high voltage alternating current systems in coal mines has not been readily accepted by some as being a sound and safe procedure, and until recent years there were indeed very few such installations from which to draw experience or which could be cited as proof that undue hazards are not present. Particular mention will be made herein to such underground systems of distribution. Since the servicing of substation units by pole line and borehole presents no problems of unsolved or unproven nature, other than the usual difficulties of terrain, rights of way, etc., it becomes necessary to consider underground high voltage distribution methods for economic reasons or as providing advantages due to unusual conditions. Some of these conditions are enumerated as follows:

1. Great depth of cover making the drilling of bore-holes costly.



Ignitron mercury arc rectifier in underground substation in a large coal mine near Pittsburgh, Pa.



This motor generator station and cable system is also underground

2. Inaccessability to outdoor substations and pole lines due to poor roads or no roads and difficult terrain.
3. Lack of the possession of surface rights and inability to obtain the necessary rights of way for pole line construction.
4. Closely settled areas, railroads and other surface conditions which increase the responsibility of pole line ownership.
5. Storm and lightning hazards.

Certain of the conditions outlined above are not general but where they do occur a problem arises and since the two systems are economically competitive, comparisons are worth while even though a broad conclusion as to relative merit is not possible. As is sometimes true with problems of this nature, economics may be of no avail and the type of installation may be dictated by unusual conditions or requirements.

Several methods of installation for underground alternating current systems will be discussed and the governing reasons for the methods selected will be given. All of these methods involve the use of what is commonly called parkway cable and sometimes, just "underground cable," most of the cables being 3 conductor and built for voltages of 2,300 or 4,000 volts a.c.

Power Distribution

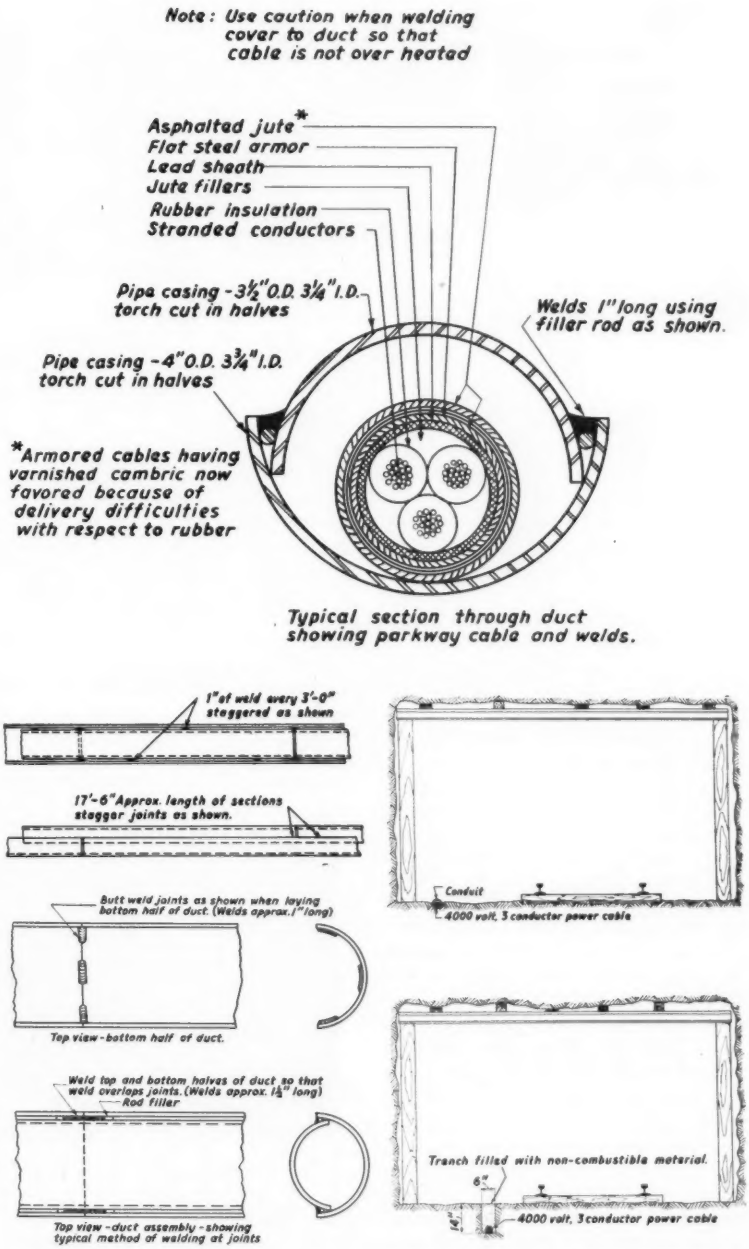
The majority of coal mines no doubt purchase or generate power at 2,300 or 4,000 volts. The rate schedules of most power companies are not favorable to the installation of separate metering points, the cost of power on such a basis ordinarily making the extension of consumer-owned distribution systems of economic advantage even where existing power lines might well serve the purpose. In many cases this is seemingly unfair. An adjustment of rate schedules to permit of more latitude in such cases would seem justifiable.

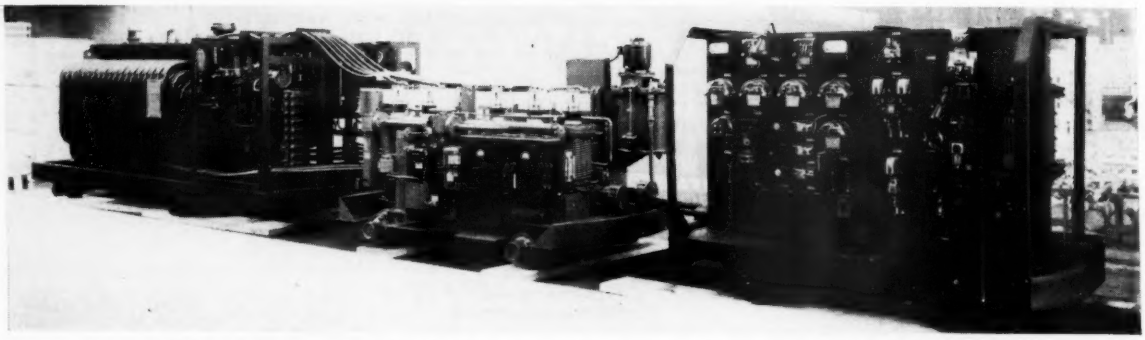
In the larger mines which are fully mechanized, distribution at 4,000 volts becomes desirable. In several such cases, rectifiers or motor-generators have been installed and the underground distribution system fed from an auto-transformer stepping the voltage up from the 2,300-volt supply at which they are metered.

As the 2,300-volt system is usually connected delta, and the 4,000 volts circuits wye, consideration must be given to the fault characteristics and protective apparatus required. In the case of cable systems, a ground detector is usually provided.

Several methods have been suggested for the installation of these cables, most of them having been tried with varying success depending on local conditions. In a few cases the cable has been supported on a messenger wire fastened to the roof or rib in the haulage entry or an untracked parallel entry. It is contended by some mine inspectors and safety officials that this is not a safe method as roof falls, derailments or other disturbances may cause difficulty. There are one or two such installations still in use and it is considered by some to be a satisfactory method.

In some states the methods of installation are definitely prescribed. In Pennsylvania the mining law requires that the cable shall be buried in a trench, not less than 12 inches in


Note: Use caution when welding cover to duct so that cable is not over heated
Asphalted jute*
Flat steel armor
Lead sheath
Jute fillers
Rubber insulation
Stranded conductors
Pipe casing - 3½" O.D. 3¼" I.D. torch cut in halves
Pipe casing - 4" O.D. 3¾" I.D. torch cut in halves
Welds 1" long using filler rod as shown.
*Armored cables having varnished cambric now favored because of delivery difficulties with respect to rubber
Typical section through duct showing parkway cable and welds.
1" of weld every 3'-0" staggered as shown
17'-6" Approx. length of sections stagger joints as shown.
Butt weld joints as shown when laying bottom half of duct. (Welds approx. 1" long)
Top view - bottom half of duct.
Weld top and bottom halves of duct so that weld overlaps joints. (Welds approx. 1½" long)
Rod filler
Top view - duct assembly - showing typical method of welding at joints
Conduit
4000 volt, 3 conductor power cable
Trench filled with non-combustible material.
6"
4000 volt, 3 conductor power cable
Some details on welding the power cable conduit and location of cables underground



Typical portable mercury arc rectifier station unit 30 k.w., 275 volts, for use underground where required

depth, below any combustible material unless it is enclosed in a fire-proof protecting conduit. It additionally provides that where the cable passes under mine tracks it shall be buried to a depth of 36 inches unless it be placed in a protective conduit. Cables must also possess a metallic shield or armor over each conductor insulation or as an alternate, a shield over the grouped conductors.

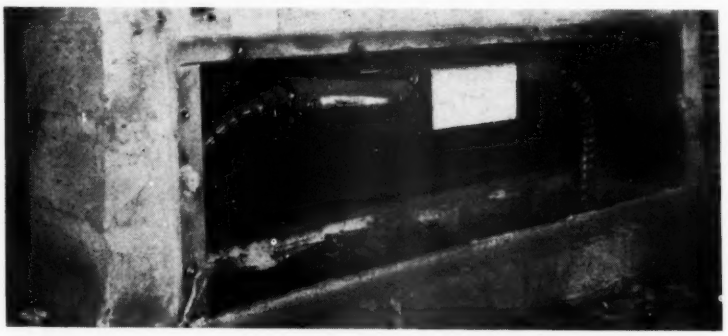
It is quite apparent that the cost of a conduit continuously encasing the cable may be considerable. For this reason the installations with which the author is familiar have been made using the trenching and burial method. The trenches have usually been cut by means of a coal-cutting machine having a shearing position. While most of the mine bottoms have been found to cut without excessive difficulty, local rolls or hard places do occur where shooting and hand work is needed. In some mines these difficulties are found to be so serious that the conduit method is apparently justified where pole line construction is found an impractical answer.

Where the cable may be satisfactorily buried, it is usually reeled out and laid along the haulage road so that it may be promptly placed in the trench before additional cleaning out becomes necessary. The cable is usually ordered in definite lengths and on reels which are as large as may be properly handled in the particular mine. On the average, the cable is in lengths of from 800 to 1,200 feet. Junction boxes are installed in the ribs, usually protected by a steel enclosure. These boxes serve as disconnecting points, should testing become necessary and are considered to be better than buried joints.

Installations are soon to be made in which the cable will be placed in a protective steel conduit. Good used pipe or mill second grade tubing is considered to be quite suitable for this purpose. The cable being too heavy for pulling into great lengths of conduit, the possibility of splitting the duct and fastening the cover section by welding are being explored, also the feasibility of threading the duct sections over the cable a length at a time, may be considered. There are many advantages and disadvantages to consider and only further experience can provide the answer. Illustrations are given of both proven and untried installation methods for mine cables.

Several such underground cable systems as mentioned herein have been in use for from 10 to 12 years and it is believed have given no more trouble than would have been expected of an equivalent pole line structure. Certain cable installations have given excessive trouble though certainly not providing justification for unfavorable conclusions.

Several comparisons have been recently made with regard to the cost and operating features of cables and pole lines. As has been previously expressed the widely variant conditions encountered, make it unwise to adopt a conclusive viewpoint, however, considering a normal condition of mine and surface terrain it is believed that the underground cable installation, wherein the cable is buried, will be found to be more economical than a pole line of equivalent efficiency and life; this being true of the usual sizes of either varnished cambric, lead and steel covered cables as now available or the all-rubber cables. It has been found however, that cables having conductor sizes larger than No. 2/o A.W.G. are not likely to be less costly than an equivalent pole line. In other words the cost per unit length is about equal for this circuit capacity. This comparison has been derived from actual installation costs of equivalent cable systems and pole lines and confirmed in recent cost estimates. The lower inductance of the cable which permits the use of less copper for the same circuit efficiency is of course, one of the major advantages favoring the underground cable in the development of a cost comparison.



Plug type cable joint in high voltage cable. The cover of the enclosure is removed

Of the many objections which have been expressed to high voltage underground power systems, it is believed that those pertaining to safety have been least substantiated by experience. Objections to the physical characteristics of installations are of course, well substantiated in some cases. It is not meant to convey the thought that high voltage circuits are not more

(*Continued on page 76*)

The American Mining Congress

19th ANNUAL COAL CONVENTION

Netherland Plaza, Cincinnati, Ohio

April 27-28, 1942

COAL'S PLEDGE

The Operators

OPERATORS of the coal mines of the United States are performing an outstanding service to the people and the government of this country in furnishing one of the most critical commodities essential to the winning of the war and final victory. From the standpoint of weight, volume, or quantity, the coal industry is America's greatest industry. In 1941 the bituminous mines produced in excess of 500,000,000 tons or 12,500,000,000 bushels of coal. The anthracite mines produced 50,000,000 tons or 1,250,000,000 additional bushels. In 1942 they are expected to have a combined production of 600,000,000 tons or 15,000,000,000 bushels. To produce, process, and deliver this coal requires approximately 2,000,000 men. More than 1/5 of the total railroad capacity is engaged in the transportation of coal and in addition, a great part of the tonnage handled by coastwise, lake, and river transportation is devoted to coal business. By weight it is 6 or 7 times the production of steel per annum.

The coal mines of this country have sustained serious financial losses over the past 15 years. The operators of these coal mines have been required to exercise all the ingenuity, foresight, skill, and courage they possess to stay in business during this time. They have made and are making a successful fight to maintain and operate their mines and furnish the nation with an adequate coal supply despite these operating losses. They have achieved a substantial measure of success in holding their properties and communities together, modernizing their production methods, cleaning, preparing, and sizing their coal. Fifteen years ago they were producing a raw product. Today in a large measure the industry is furnishing consumers with special sized, prepared, and cleaned coals which are much more efficient than the coals prepared and sold during the World War. It is estimated that these coals have from 20 to 25 per cent greater efficiency than the coals produced 25 years ago. This means savings in cost to consumers through increased efficiency and conserving vital transportation facilities.

The war demand is going to tax the capacity of the nation's coal mines. The equipment and supplies of a great many of the mines are run down due to long years of financial difficulty. However, the operators as a whole are resourceful and believe that if the coal industry is furnished with a reasonable supply of the machinery, tools, and equipment essential to its operation, and allowed to keep the essential manpower at the mines, this basic and critical industry can and will serve the nation well. It will supply the coal required to manufacture steel, tanks, guns, airplanes, shells, bombs, and other implements of war. It will supply the fuel required to heat our homes and it will supply heat, power, and light to the essential industry and civilian population until the war ends and victory is achieved. To this purpose the coal producers of America pledge their loyal support.

The Manufacturers

WE, THE MANUFACTURERS of machinery used by the coal industry are deeply conscious of our obligation to assist in every possible way the advancement of the Victory program, and pledge our full cooperation, experience and facilities toward that end.

It is indeed fortunate that we have Dr. Wilbur A. Nelson as administrator of the Mining Branch of the War Production Board. He has demonstrated a breadth of understanding of the problems of both coal producers and manufacturers. He has intelligently cooperated with the leaders of the American Mining Congress, the coal producers and the manufacturers in developing and executing relief measures for the handling of priorities, with the result that uninterrupted production of coal has been realized.

The unprecedented load that has been accepted by the mine operators and by the manufacturers of machinery due to our Victory program must, of necessity, include adequate maintenance of mechanical equipment used at the mines. Not only that but further mechanization, both underground and on the surface, is essential if the industry is to release more of its workers for military service.

It therefore follows that coal mining must exercise the keenest ingenuity to keep its mechanized equipment in continuous operation and that the manufacturers must efficiently serve the coal industry by promptly supplying repair parts, additional machines and even complete new mine facilities as the emergency warrants.

We pledge our continued and unceasing research toward the discovering of suitable substitutes for critical metals and materials so that the production of coal can go on uninterrupted, as heretofore.

Only in this way can coal continue to function as the prime source of heat and power for industry, and fuel for our blast furnaces, to the end that the production of the tools of war may be accelerated to the full extent—until Victory is ours.

The 19th COAL CONVENTION

J. NOBLE SNIDER
Vice President, Consolidation Coal Co.

As National Chairman, Mr. Snider heads an industry-wide Committee which has developed a program of special interest to the industry at this crucial time.

★ ★ ★

HARRY M. MOSES
President, H. C. Frick Coke Co.

Newly selected Chairman of the Coal Division of the American Mining Congress, Mr. Moses will direct the Division's work in developing improved operating methods and practices.

COAL—millions of tons every month flow in an ever growing stream to the thousands of industrial plants of the nation charged with producing steel and power for turning out tanks, airplanes, ships, guns and ammunition in overwhelming volume to beat the Axis. As demand for coal rises, the industry realizes the significance of its own timely and important "war council" in Cincinnati, April 27 and 28 at the 19th Annual Coal Convention of the American Mining Congress to be held at the Netherland Plaza Hotel. Key men from mining districts throughout the country will attend and swap strategic ideas and learn more about operating and other leading problems of an all-out war effort. The industry is confronted with situations as the rising tempo of mechanized coal output supplies the nation's war effort. Operators are sensing that a broader and more liberal exchange of information has become vital to achieve the industry's objectives in winning the war.

The magnitude of the task in 1942 is well summarized in the foregoing letter from "The Operators". Problems have not been simple even in peace times, for an industry that has suffered long term losses as has coal mining, and the future will probably supply its quota of headaches. Mine operators depend upon manufacturers for equipment and supplies and they, in turn, must look to Government authorities to allow them the raw materials for producing machinery. In the letter from "The Manufacturers" is found a clear statement of the realistic attitude held by the War Production Board on the importance of the coal industry. No higher authority could set the course for both coal operators and manufacturers to follow than WPB and the industry has shouldered its arms.

The theme of the program, therefore, is "Coal—Vital to Victory", and subjects have been selected to suit the urgent needs of a war-minded industry. Papers and discussions will describe how all branches of coal mining are being geared for higher performance standards and what adjustments are being made to reduce operating delays. Mechanization will be featured in all of its phases, covering different types of loading and conveying equipment; particularly, emphasis will be given to maintenance, conservation of material, rebuilding machine parts, and the use of substitute materials. Management will be discussed, stressing personnel and employment problems caused by the selective draft and by men transferring to munitions production. Important phases of safety, special aspects of surface preparation as well as the subjects of cutting, blasting and ventilation will be presented from the standpoint of tonnage production.

National wartime problems will be presented by representatives of U. S. governmental agencies and will cover the all-important subjects of priorities, scrap salvage, coal distribution, and sabotage prevention. These speakers, as shown on the accompanying program, are men who are high in the councils of our Government and are qualified to speak with authority.

The program subjects have a wide range

—Attention—

Men Between the Ages of 44 and 65 Can Register at the Convention

Don't have any doubts about coming to the convention because you must register for the Selective Service on Monday, April 27. We want to assure you that special arrangements have been made by the Selective Service Branch to register all who need to do so in the lobby of the Netherland Plaza Hotel. Therefore, this important duty may be discharged during your attendance at the industry's annual "war council." Hours: 12 noon to 6 p. m., on April 25 and 26 and from 7 a. m. to 10 p. m., April 27.

This will be the 4th registration under the Selective Training and Service Act. Every male citizen of the United States, and every other male person residing in continental United States or in the territories, other than persons specifically exempted by law, born on or after April 28, 1877, and on or before February 16, 1897, who have not heretofore been registered under the Act, must register.

HOWARD I. YOUNG

President, American Zinc, Lead and Smelting Co.

As President of the American Mining Congress, Mr. Young has led the combined mining industries of this country in a program of broad cooperation and development which today means much to the nation's war effort.

★ ★ ★

E. J. BURNELL

Vice President, Link-Belt Co.

With the Exposition of mining machinery and supplies cancelled by WPB, Mr. Burnell as Chairman of the Manufacturers Division has led the manufacturers' cooperation with the Convention plans.

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Sloss-Sheffield Steel & Iron Co.
ALABAMA

FRED A. MILLER
Franklin County Coal Corp.
ILLINOIS

H. P. SMITH
Princeton Mining Co.
INDIANA

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Dawson-Daylight Coal Co.
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ROCKY MOUNTAIN

STANLEE HAMPTON
Tennessee Consolidated Coal Co.
TENNESSEE

W. C. SHUNK
Peerless Coal Corp.
VIRGINIA

A. E. MARRIOTT
Marriott-Reed Coal Co.
WEST CENTRAL

CARL SCHOLZ
Consulting Engr.
WEST VIRGINIA

S. W. BLAKSLEE
Powhatan Mining Co.
OHIO

F. B. DUNBAR
Mather Collieries
PENNSYLVANIA

THOS. B. CLAGETT
Pocahontas Land Corp.

C. J. FLIPPEN
N. & W. Railway

G. E. HOOVER
Chesapeake & Ohio Rwy. Co.

H. B. McNARY
The New River Co.

JOS. PURSGLOVE
Pursglove Coal Mng. Co.

WALTER R. THURMONT
West Virginia Coal Operators Assn.

J. M. TULLEY
Crystal Block Coal & Coke Co.

ANTHRACITE

C. A. GARNER
Jeddo-Highland Coal Co.

W. B. GEISE
Susquehanna Collieries

B. HENDERSON
Lehigh Valley Coal Co.

STRIP MINING

K. R. BIXBY
Midland Electric Coal Corp.

T. G. GEROW
Traux-Traer Coal Co.

R. E. HENDERSON
Pyramid Coal Corp.

HUGH B. LEE
Maumee Collieries Co.

H. S. RICHARDS
Tecumseh Coal Corp.

W. H. STEWART
Central Indiana Coal Co.

J. W. WOOMER
Warner Collieries Co.

WM. L. BURT
Jefferson Co.
STRIP MINING

R. E. HOBART
Lehigh Navigation Coal Co.
ANTHRACITE

of application and in order to bring out all possible angles and to cover experiences in the different fields, there will be full and open floor discussion following each paper. Ample time will be provided for men in the audience to state their views; everyone is urged to take part, and the open forum thus provided will serve to develop many ideas helpful to all.

Special Sessions on Strip Mining

There will be special meetings on strip mining each afternoon, while the morning sessions will cover subjects of mutual interest to all branches of coal mining so that strip operators will have the fullest opportunity to hear and discuss problems of direct application to their industry.

Learn About Espionage and Sabotage

Following registration on Monday, the first general meeting at 10 A. M. will move directly into the heart of today's objectives when "Wartime Personnel Problems" will be presented and discussed. One of our most important national measures of industrial protection will be enlarged upon when members will get some pertinent suggestions from E. P. Coffey, Chief of the Technical Laboratory, Federal Bureau of Investigation on "Prevention of Espionage and Sabotage". At Monday's luncheon meeting, T. J. Thomas, Associate Director of Bituminous Coal, Office of Solid Fuels Coordination will bring members up to date on the industry's leading responsibility "for the duration", when he discusses "Coal Production and Distribution". Afternoon sessions following the luncheon will be spent to good advantage getting the latest on mechanical loading and conveying and strip mining.

The opportunity to see your friends among operators and manufacturers will be yours Monday night. Entertainment at the King Coal Club of the Netherland Plaza Hotel will as usual be an interesting event for both ladies and gentlemen.

Priorities—A Hot Subject

A highlight of Tuesday's meeting will be the luncheon, at which Dr. Wilbur A. Nelson, Administrator, Mining Branch, War Production Board, will enlighten his listeners on that

Committees on Arrangements

ATTENDANCE

H. B. CRANDELL
P. L. DONIE
HUGH P. FINLEY
C. A. GARNER
W. J. JENKINS
T. R. JOHNS
L. RUSSELL KELCE
HARRY LaVIERS
W. L. ROBISON
R. E. SALVATI
D. A. THOMAS

PUBLICITY

G. R. DELAMATER
F. L. DEWEY
A. L. JOHNSTON
F. J. MAPLE
L. L. McKEE
JOHN SWENEHART

ENTERTAINMENT

E. B. AGEE
CHAS. W. CONNOR
M. L. COULTER
B. R. GEBHART
HOMER GODDARD
CHRIS HYLAND
GEO. S. JAXON
E. F. LUNA
W. S. McALEER
BLAINE MIKESELL
ALFRED S. OTTON
JOHN T. RYAN, JR.
J. H. SANFORD
E. A. SIEMON
VAN B. STITH
WHITNEY WARNER, JR.
W. K. WILBUR
J. E. M. WILSON

FLOOR

R. L. AUCHMUTY
A. LEE BARRETT
C. V. BECK
C. S. BLAIR
C. F. CONNELLY
C. W. DENHAM
H. C. MARCHANT
H. A. McALLISTER
R. J. OLDHAM
R. G. PFAHLER
PAUL H. PRICE
DAVIS READ
A. J. RUFFINI
HENRY F. WARDEN

WELCOMING

The Chairmen and Vice Chairmen, shown below, will have the cooperation of a sizable group of coal operators and manufacturers' representatives in welcoming Convention visitors to Cincinnati.

all-important problem "Priorities on Mining Equipment". If there is anything about P-56 and P-56A that you would like to have explained or any particular problem on priorities, Dr. Nelson will be glad to answer your questions.

Operators have some idea on the importance of conservation, but George T. Weymouth, Chief, Industrial Salvage Section, War Production Board, will have valuable information for members when he discusses "Salvage of Scrap Metals". Ralph E. Snoberger, a coal operator well known in the industry, now serving with the Industrial Salvage Section, WPB, will also give a talk of special interest to operators on scrap metal salvage in coal mines. Others subjects for discussion on that day are, coal preparation, mine safety, and mobile mechanical loading.

The Annual Banquet will be held Tuesday night in the Hall of Mirrors of the Netherland Plaza. A nationally known person will be present to speak on the latest war developments and distinctive entertainment will afford an opportunity to relax after the strenuous activity of the meeting.

Entertainment for Ladies

Family life has more responsibilities these days for all members, but ladies who visit the Convention with their husbands will find entertainment has been planned for them as usual. Their presence will add greatly to the pleasure of all who attend the King Coal Club dinner on Monday night and the Annual Banquet on Tuesday.

Chairmen: Committees on Arrangements

GEO. F. CAMPBELL
Old Ben Coal Corp.
ATTENDANCE

H. H. BULLEN
American Steel & Wire Co.
PUBLICITY

T. M. GOOGIN
Westinghouse Elec. & Mfg. Co.
ENTERTAINMENT

F. S. PFAHLER
Superior Coal Co.
WELCOMING

G. E. HOOVER
Chesapeake & Ohio Railway Co.
WELCOMING

C. J. POTTER
Rochester & Pittsburgh Coal Co.
FLOOR

Program

MONDAY, APRIL 27

Morning Session

10:00 A. M.—WARTIME PROBLEMS

Opening of Convention

JULIAN D. CONOVER
Secretary, American Mining Congress

Session Chairman:

J. NOBLE SNIDER
Vice Pres., Consolidation Coal Co.
National Chairman, Program Committee

Introducing:

HARRY M. MOSES
Pres., H. C. Frick Coke Co.,
Chairman, Coal Division, American Mining Congress

E. J. BURNELL
Vice Pres., Link-Belt Co.
Chairman, Manufacturers Division, American Mining Congress

Wartime Personnel Problems

W. B. GEISE
Susquehanna Collieries Co.

Prevention of Espionage and Sabotage

E. P. COFFEY
Chief, Technical Laboratory,
Federal Bureau of Investigation

12:30 P. M.—LUNCHEON—Hall of Mirrors, Netherland Plaza Hotel

Presiding:

CHARLES DORRANCE,
Pres., West Virginia Coal & Coke Corporation

Address:

Coal Production and Distribution

T. J. THOMAS
Associate Director of Bituminous Coal, Office of Solid Fuels Coordination

★ ★ ★

Afternoon Session

2:00 P. M.—LOADING AND CONVEYING
Meeting Room "A"

Session Chairman:

H. C. ROSE
Production Mgr., Pittsburgh Coal Co

Duckbill Mechanical Loading

PAUL R. WICKLIFFE
Pres., Greenville Coal Co.

Gathering Belts and Multiple Conveyor Units

E. H. JENKS
Chief Engr., Rochester & Pittsburgh Coal Co.

Maintenance and Conservation of Equipment

EDGAR SCHWEITZER
Lehigh Valley Coal Co.

2:00P. M.—STRIP MINING
Meeting Room "B"

Session Chairman:

H. S. RICHARDS
Gen. Mgr., Tecumseh Coal Corp.

Primary and Tandem Dragline Operations

LAFE STEWART
Chief Engr., Maumee Collieries Co.

Power Distribution and Protective Devices

RUSSELL L. ALPINE
Chief Elec., The Enos Coal Mining Co.

Drift Mining from Strip Pits

J. M. McCOY
Engineer, Traux-Traer Coal Co.

★ ★ ★

TUESDAY, APRIL 28

Morning Session

9:30 A. M.—PHASES OF SAFETY
Meeting Room "A"

Session Chairman:

E. R. PRICE
Gen. Supt., Inland Steel Co.

Explosives—Handling and Distributing Underground

B. L. LUBELSKY
Engineering Manager, Powhatan Mining Co.

Mine Ventilation and Sealing Abandoned Areas

WALTER E. BUSS
Mining Eng., Knox Consolidated Coal Corporation

Coal Dust Allaying in Cutting, Loading and Transporting

J. C. JOHNSTON
General Inspector, Koppers Coal Div., Eastern Gas & Fuel Associates

12:30 P. M.—LUNCHEON—Hall of Mirrors, Netherland Plaza Hotel

Presiding:

JOHN W. HADDOCK
Vice Pres., Sullivan Machinery Co.
Vice Chairman, Manufacturers Division, American Mining Congress

Address:

Priorities on Mining Equipment

WILBUR A. NELSON
Administrator of Mining Branch, War Production Board

9:30 A. M.—COAL PREPARATION
Meeting Room "B"

Session Chairman:

J. S. FORMAN
Vice Pres., Mt. Olive & Staunton Coal Co.

Wartime Coal Preparation—Maintaining Quality Standards

W. D. STEELE
Preparation Mgr., Consolidation Coal Company

Coal Drying and Preparation Auxiliaries

JAMES HYSLOP
Gen. Mgr., Hanna Coal Co.

Face Operations—Cutting, Blasting

F. EARLE SNARR
Asst. to Gen. Supt., Chicago, Wilmington & Franklin Coal Co.

★ ★ ★

Afternoon Session

2:00 P. M.—MECHANICAL LOADING
Meeting Room "A"

Session Chairman:

R. E. SALVATI
Vice Pres., Island Creek Coal Co.

Track Mounted Loading Machines

AUGUST J. BREITENSTEIN
Asst. Mng. Engr., H. C. Frick Coke Company

Tractor Loaders with Shuttle Cars

ARTHUR PHILLIPS
Supt., Peabody Coal Co.

Salvage of Scrap Metals

GEORGE T. WEYMOUTH
Chief, Industrial Salvage Section, War Production Board

R. E. SNOBERGER
Salvage Director, Coal Mining Industry, War Production Board

2:00 P. M.—STRIP MINING
Meeting Room "B"

Session Chairman:

K. A. SPENCER
Vice Pres., Pittsburg & Midway Coal Mining Co.

Shovel Tooth Design and Maintenance

O. E. MAY
Chief Engr., Northern Illinois Coal Corporation

Strip Mine Haulage

A. D. HENRY
Asst. Supt., The Jefferson Co.

Candid Comments From Operators

With war demands calling on the coal industry to produce at maximum capacity, this is one year that managers, assistants and key men cannot afford to miss the Cincinnati Convention. In my opinion the discussions on operating subjects are invaluable. Manufacturers are also deeply interested since the mining industry has never known a time when operators were more ready to accept and apply the advancements and improvements of mining equipment to present day methods.

—*W. J. Jenkins*, Consolidated Coal Company

Probably never before has the bituminous coal industry been so aware that it needs—and needs badly—help from outside itself to enable it to increase its per man production. War demands are requiring a larger production of coal—but, war demands are also reducing the man supply at the mines. The problem—to produce more coal with fewer men. The answer—greater degree of mechanization making for more tons per man—many operators will seek the answer to this at Cincinnati.

—*W. L. Robison*, Y & O Coal Company

Our Convention and get-together meeting in April, I feel, is more important to the mining industry than at any other time in our history. We are at war, the Government needs more coal from all of us. We are losing young, efficient, trained men every day to our armed forces. Material is getting hard to secure—we are being asked to produce our greatest tonnage. How can we do it? Our companies are going to send all of their key men to Cincinnati in April to find out what other companies are doing about it.

—*L. Russell Kelce*, Sinclair Coal Company

I believe it to the best interest of every coal man to attend the Convention in Cincinnati this year—an outstanding program is being arranged which will include addresses on "Priorities" and other matters so important to our industry today. I feel the Convention will really mean more to all of us this year, due to the serious situation now confronting us, and therefore most earnestly urge every one who can do so to attend this meeting.

—*R. E. Salvati*, Island Creek Coal Company

In these strenuous times, when employer and employe are being called upon for "all-out" performances in industry, it would seem clear that a record-breaking attendance at this year's Coal Show would be a natural reaction on the part of the coal mining industry—a patriotic platform from which to discuss ways and means of closer cooperation, resulting in greater production of coal so necessary to fill our Government's orders for defense material, and hastening the early completion of the titanic task.

—*T. R. Johns*, Industrial Collieries Corp.

After attending a number of meetings at which the program was discussed, I am tremendously impressed with the importance of this year's convention. The anthracite industry, in common with the mining industry in general, is faced with problems of personnel, maintenance of equipment, etc. The papers should be fruitful of many needed and helpful ideas. I feel, therefore, that every company will endeavor to have their key men attend.

—*C. A. Garner*, Jeddo Highland Coal Company

The 1942 Convention is of major and outstanding importance to the coal industry and should be so regarded by all producers and manufacturers. The wartime needs of our nation must and will be met in full. This convention can well be termed the clearing house for the promotion of ideas that will result in this job being accomplished to its fullest measure and with maximum efficiency. "Coal—Vital to Victory" is truly a correct theme for the convention.

—*D. A. Thomas*, Montevallo Coal Mining Co.

Coal Directors

J. B. WARRINER
Lehigh Navigation Coal Co.

J. D. FRANCIS
Island Creek Coal Co.

GRANT STAUFFER
Sinclair Coal Co.

W. J. JENKINS
Consolidated Coal Co.

The Cincinnati Coal Convention in April will be the most worth while attending get-together in years. Problems confronting the coal industry were never so complex; shortage of manpower; demands of labor; priorities; ideas and substitutes for unavailable items; railroad car shortages; stockpiles; minimum and maximum prices on your product, etc. Always the best thoughts, information and opinions are expressed when you rub shoulders with your fellow coal operators and manufacturers.

—*H. B. Crandell*, Clayton Coal Company

It is most important that equipment crews, in charge of maintenance, learn more about what substitutes can serve our purposes and how best to keep present equipment in long continuous operation with a minimum of time and labor. The sending of as many key men as possible to the Cincinnati Convention will promote efficiency, cooperation and a realization that we have a real job to do to keep the coal moving in order to maintain what our forefathers have fought, bled and died for.

—*H. P. Finley*, Proctor Coal Company

The bituminous coal industry today faces a problem brought about by any one or all of four factors: First, increased demand for coal; Second, slowing up transportation facilities; Third, a decreased labor supply; Fourth, a decrease in the supply of equipment and repairs. All will be discussed in some form at the convention in Cincinnati, and I believe it is the duty as well as the privilege of every operating and supervisory official of the industry, to attend and take part in the discussion.

—*Harry LaViers*, South-East Coal Company

I believe the annual American Mining Congress Convention to be an invaluable experience to all coal men, in fact the most important. Therefore, it is my opinion that the coal company which fails to participate in the benefits offered by the exchange of practical ideas offered by the week of convention will miss many steps to successful mine operation at a time when the defense program demands our *ALL OUT* efforts.

—*P. L. Donie*, Little Betty Mining Corp.

No Machinery Exhibits

In response to the War Production Board's request, the coal industry will this year forego the usual Exposition of the industry's "tools of war". This is the first time in 19 years that exhibits at the convention will be lacking, but operators and manufacturers will meet during the two-day gathering to exchange views and impart helpful information. The meeting will constitute an industry-wide "clinic" for diagnosis of present-day problems and for taking counsel on the best means of meeting them. Manufacturers have an all-important role to play, and their representatives will be on hand to cooperate with their customers, to the end that most effective use may be made of all coal-producing and coal-treating equipment in the industry's determination to do its part in winning the war.

Conspicuous by its absence this year, among these pages, is the usual description of new and other equipment and supplies that manufacturers send us for publication prior to the exhibition. Reason:—manufacturers are busily engaged in devoting their time and efforts to the serious problem of winning the war and have decided to give minimum attention to exploiting new equipment and services.

Government Representatives on the Program

WILBUR A. NELSON
Administrator Mining Branch, War Production Board

T. J. THOMAS
Associate Director of Bituminous Coal, Office of Solid Fuels Coordination

E. P. COFFEY
Chief, Technical Laboratory Federal Bureau of Investigation

GEO. T. WEYMOUTH
Chief, Industrial Salvage Section, War Production Board

R. E. SNOBERGER
Salvage Director, Coal Mining Industry, War Production Board

Convention Proceedings

The complete papers and discussions of this great wartime Coal Convention will be available to you immediately after the meeting—in the 1942 Coal Mine Modernization Yearbook of the American Mining Congress.

Running coal today isn't a snap job by any means—it calls for all the ingenuity and resourcefulness you can muster—and it's just plain common sense to take full advantage of the experiences of others.

The 1942 Yearbook brings you scores of practical ideas, carefully explained and illustrated—in the detailed accounts of successful methods and practices of leading mining companies. It's a modern coal mining manual by a handpicked group of progressive coal men from all over the country—that's why it's chock full of ideas from cover to cover!

Off the press about July 10. Printing limited! Order your copy today.

1 to 4 copies	$2.00 each
5 to 9 copies	1.75 each
10 to 14 copies	1.60 each
15 or more copies	1.50 each

Manufacturers Who Had Planned Exhibits at the Coal Show

ALLIS-CHALMERS MFG. CO.
Milwaukee, Wis.

AMERICAN BRATTICE CLOTH CORP.
Warsaw, Ind.

AMERICAN CAR & FOUNDRY CO.
30 Church St., New York City

AMERICAN CHAIN & CABLE CO., INC.
Bridgeport, Conn.

AMERICAN CYANAMID & CHEMICAL CORP.
30 Rockefeller Plaza, New York City

ATLAS POWDER CO.
Wilmington, Del.

BARBER-GREENE CO.
Aurora, Ill.

BETHLEHEM STEEL CO., INC.
Bethlehem, Pa.

BIXBY-ZIMMER ENGINEERING CO.
Galesburg, Ill.

BOWDIL COMPANY
Canton, Ohio

BRODERICK & BASCOM ROPE CO.
4203 N. Union Blvd., St. Louis, Mo.

BROWN-FAYRO CO.
940 Ash St., Johnstown, Pa.

BUCYRUS-ERIE CO.
South Milwaukee, Wis.

CARDOX CORPORATION
307 N. Michigan Ave., Chicago, Ill.

CENTRIFUGAL & MECHANICAL INDUSTRIES, INC.
146 President St., St. Louis, Mo.

CHICAGO PNEUMATIC TOOL CO.
6 E. 44th St., New York City

CINCINNATI MINE MACHINERY CO.
Cincinnati, Ohio

CITIES SERVICE OIL CO.
60 Wall Tower, New York City

COAL AGE
330 W. 42nd St., New York City

DEISTER CONCENTRATOR CO.
Fort Wayne, Ind.

DEISTER MACHINE CO.
Fort Wayne, Ind.

DIFFERENTIAL STEEL CAR CO.
Findlay, Ohio

DUFF-NORTON MFG. CO.
Pittsburgh, Pa.

DU PONT DE NEMOURS & CO., INC., E. I.
Wilmington, Del.

EDISON, INC., THOMAS A.
West Orange, N. J.

ELECTRIC RAILWAY EQUIPMENT CO.
Cincinnati, Ohio

ELECTRIC RAILWAY IMPROVEMENT CO.
2070 E. 61st Place, Cleveland, Ohio.

ELECTRIC STORAGE BATTERY CO.
Allegheny Ave. & 19th St., Philadelphia, Pa.

FLOOD CITY BRASS & ELECTRIC CO.
Messenger & Elder Sts., Johnstown, Pa.

GIBRALTAR EQUIPMENT & MFG. CO.
Alton, Ill.

GOODMAN MFG. CO.
Halsted St. & 48th Place, Chicago, Ill.

GORMAN-RUPP CO.
Mansfield, Ohio

GULF OIL CORP.
Gulf Bldg., Pittsburgh, Pa.

GUYAN MACHINERY CO.
Logan, W. Va.

HENDRICK MFG. CO.
Carbondale, Pa.

HERCULES POWDER CO., INC.,
Wilmington, Del.

HOCKENSMITH WHEEL & MINE CAR CO.
Penn, Pa.

HULBURT OIL & GREASE CO.
Philadelphia, Pa.

IMPERIAL BRONZE MFG. CO.
Jellico, Tenn.

I-T-E CIRCUIT BREAKER CO.
19th & Hamilton Sts., Philadelphia, Pa.

JEFFREY MFG. CO.
Columbus, Ohio

JOHNSON-MARCH CORP.
52 Vanderbilt Ave., New York City

JOY MFG. CO.
Franklin, Pa.

KENSINGTON STEEL CO.
505 Kensington Ave., Chicago, Ill.

KING POWDER CO., INC.
Cincinnati, Ohio

KOPPERS CO. (Wood Preserving Div.)
Pittsburgh, Pa.

LA-DEL CONVEYOR & MFG. CO.
New Philadelphia, Ohio

LESCHEN & SONS ROPE CO., A.
5909 Kennerly Ave., St. Louis, Mo.

LINK-BELT CO.
307 N. Michigan Ave., Chicago, Ill.

McNALLY-PITTSBURG MFG. CORP.
307 N. Michigan Ave., Chicago, Ill.

MACK TRUCKS, INC.
48th Ave. & 34th St.
Long Island City, N. Y.

MACWHYTE COMPANY,
Kenosha, Wis.

MARION STEAM SHOVEL CO.
Marion, Ohio

MECHANIZATION, INC.
406 Munsey Bldg., Washington, D. C.

MINE SAFETY APPLIANCES CO.
Pittsburgh, Pa.

MINING CONGRESS JOURNAL
309 Munsey Bldg., Washington, D. C.

MINING MACHINE PARTS, INC.
7033-7035 St. Clair Ave., Cleveland, Ohio

MYERS-WHALEY CO.
Knoxville, Tenn.

NATIONAL ELECTRIC COIL CO.
Columbus, Ohio

NATIONAL MALLEABLE & STEEL CASTINGS CO.
Cleveland, Ohio

OHIO BRASS CO.
Mansfield, Ohio

OHIO CARBON CO.
12508 Berea Road, Cleveland, Ohio

OSMOSE WOOD PRESERVING CO. OF AMERICA, INC.
1437 Bailey Ave., Buffalo, N. Y.

OWENS-CORNING FIBERGLAS CORP.
Toledo, Ohio

PENN MACHINE CO.
Johnstown, Pa.

PENNSYLVANIA ELECTRIC COIL CORP.
1301 Sawmill Run Blvd., Pittsburgh, Pa.

PHILCO CORP.
Storage Battery Division, Trenton, N. J.

POMONA PUMP CO.
Pomona, Calif.

PORTABLE LAMP & EQUIPMENT CO.
Pittsburgh, Pa.

POST-GLOVER ELECTRIC CO.
Cincinnati, Ohio

PRINCETON FOUNDRY & SUPPLY CO.
Princeton, W. Va.

PRODUCTIVE EQUIPMENT CO.
2926-28 W. Lake St., Chicago, Ill.

PROX CO., INC., FRANK,
Terre Haute, Ind.

PURE OIL CO.
620 E. Broad St., Columbus, Ohio

ROBERTS & SCHAEFER CO.
307 N. Michigan Ave., Chicago, Ill.

ROBINS CONVEYING BELT CO.
Passaic, N. J.

ROEBLING'S SONS CO., JOHN A.
Trenton, N. J.

ROME CABLE CORP.
Rome, N. Y.

SANFORD-DAY IRON WORKS, INC.
Knoxville, Tenn.

SIMPLEX WIRE & CABLE CO.
79 Sidney St., Cambridge, Mass.

SIMPLICITY ENGINEERING CO.
Durand, Mich.

SOCONY-VACUUM OIL CO., INC.
26 Broadway, New York City

STANDARD OIL CO. (Indiana)
910 S. Michigan Ave., Chicago, Ill.

SULLIVAN MACHINERY CO.
Michigan City, Ind.

TALCOTT, INC., W. O. & M. W.
91 Sabin St., Providence, R. I.

TAMPING BAG CO.
Mt. Vernon, Ill.

TEMPLETON, KENLY & CO.
1020 S. Central Ave., Chicago, Ill.

TEXAS COMPANY,
135 E. 42nd St., New York City

TOOL STEEL GEAR & PINION CO.
Elmwood Place, Cincinnati, Ohio

TYLER CO., THE W. S.
3615 Superior Ave., N. E., Cleveland, Ohio

UNION WIRE ROPE CORP.
21st & Manchester Ave., Kansas City, Mo.

UNITED ENGINEERS & CONSTRUCTORS, INC.
1401 Arch St., Philadelphia, Pa.

U. S. STEEL CORP. SUBSIDIARIES
436 Seventh Ave., Pittsburgh, Pa.

WATT CAR & WHEEL CO.
Barnesville, Ohio

WEDGE-BAR SCREEN CO.
145 Hudson St., New York City

WEIR KILBY CORP.
Cincinnati, Ohio

WESTERN CARTRIDGE CO.
East Alton, Ill.

WESTINGHOUSE AIR BRAKE CO.
Industrial Division, Pittsburgh, Pa.

WESTINGHOUSE ELEC. & MFG. CO.
East Pittsburgh, Pa.

WEST VIRGINIA RAIL CO.
Huntington, W. Va.

WICKWIRE-SPENCER STEEL CO.
500 5th Ave., New York City

TELL US YOUR NEEDS NOW

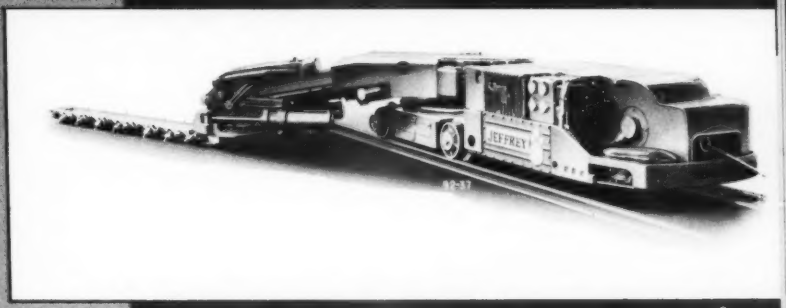
AND *Jeffrey* MACHINES & REPAIR PARTS will be available when required

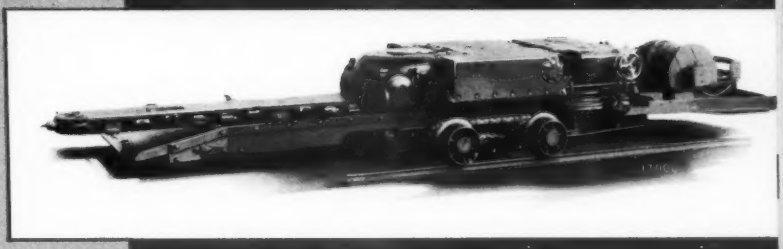
Giving us your requirements now as to type and sizes of machines you will need this year and next will enable us, in cooperation with the government, to plan our production for those units most urgently required and permit us to anticipate your needs. You will be able to get the full benefit of your equipment when needed most and be assured of continued increased production to meet War-need requirements.

COAL CUTTERS

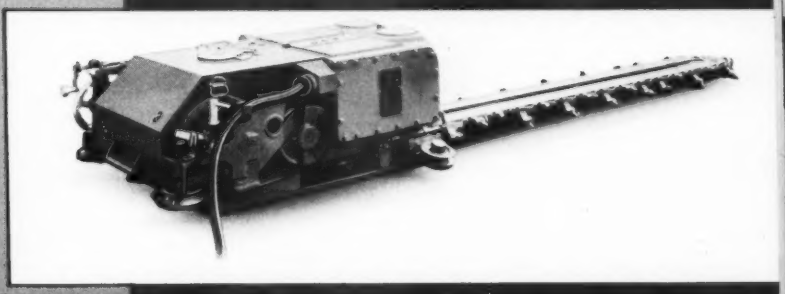
Simple, rugged and dependable units with the ability to stand up in day-after-day service. 29-U Universal (track type or crawler-mounted); 35-L low vein continuous duty shortwall; and 35-B shortwall developed for low-seam conveyor mining — shown at the right (patented).

TRACK TYPES — Patented and Patents Pending. Also licensed under the patents of E. C. Morgan. Pat. Nos. 1706961, 1706962, 1707132, 1707133, 1953325, and 1953326.



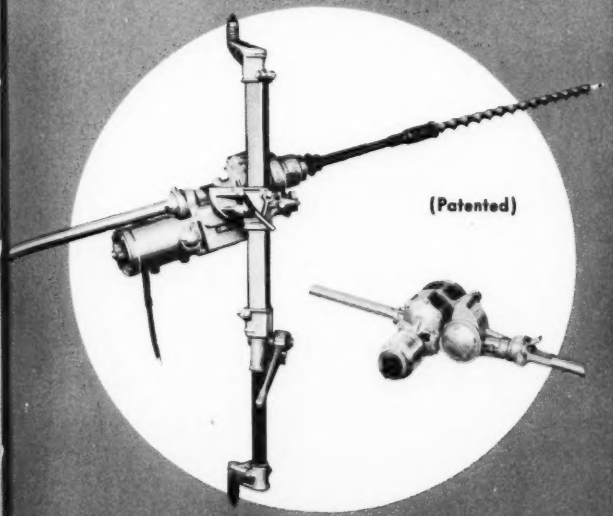


For continued efficiency use spare parts identical point for point with those they replace. Jeffrey renewal parts are manufactured to precisely the same high standards as govern original equipment.



DRILLS . . . AND DRILLING MACHINES

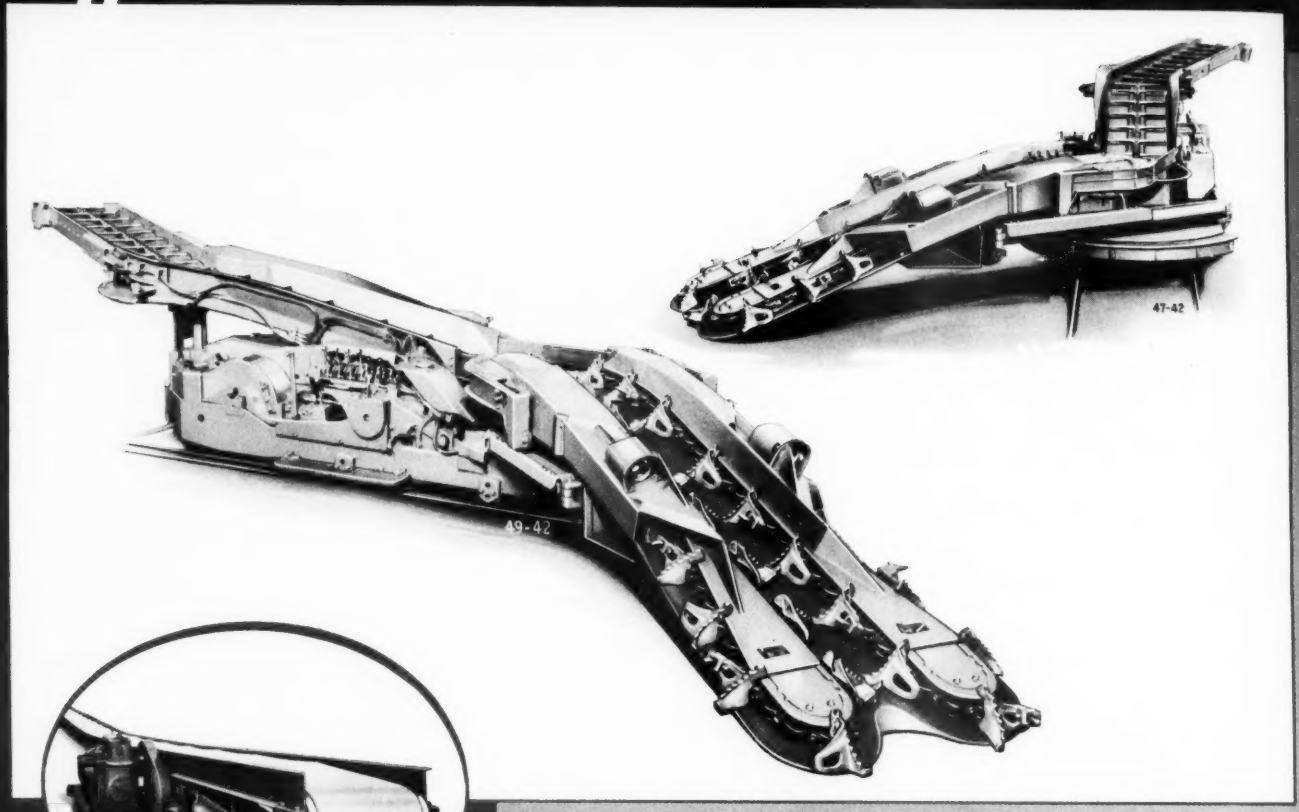
For speeding up drilling operations and placing shot holes most advantageously. Self-propelled unit (right) may be equipped with one or more rotary drills — reaches anywhere between roof and floor in rooms up to 30 feet wide.

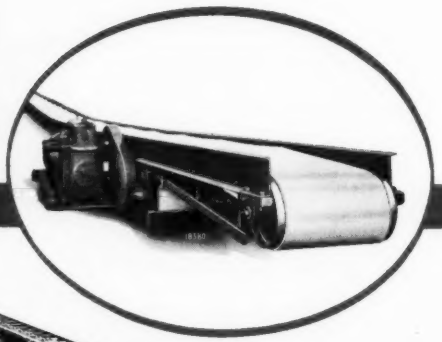


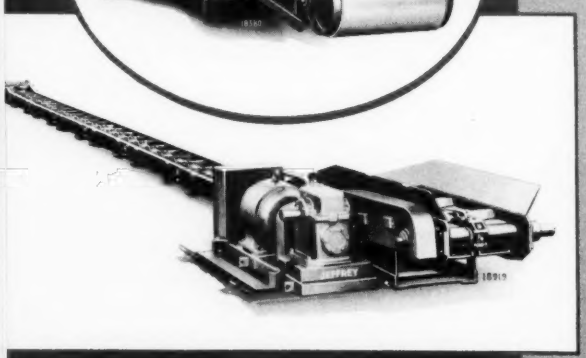
A-6 Post Drill and A-7 Hand-held Drill (above).

ANTICIPATING JEFFREY EQUIPMENT NOW

Jeffrey UNDERGROUND LOADERS AND CONVEYORS • • •

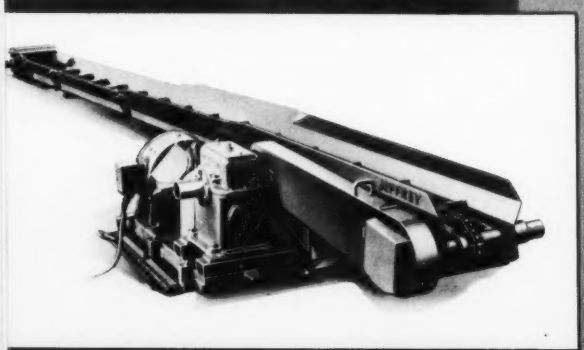






LOADERS—Mechanized loading for all conditions can be made profitable with Jeffrey loading machines. Two views of Jeffrey L-600 frontal attack, track mounted loader (Patented) are shown above. Capacity is there when needed—very flexible—has finger-tip hydraulic control and automatic cable reel to speed its movements.

UNDERGROUND CONVEYORS—To maintain more efficient production, specially under such conditions as bad grades, wet places or low voltage—Jeffrey positive-motion conveyors (Patented) are the solution. 17 different designs, chain as well as belt types, to meet all coal mining conditions. Three types are shown.



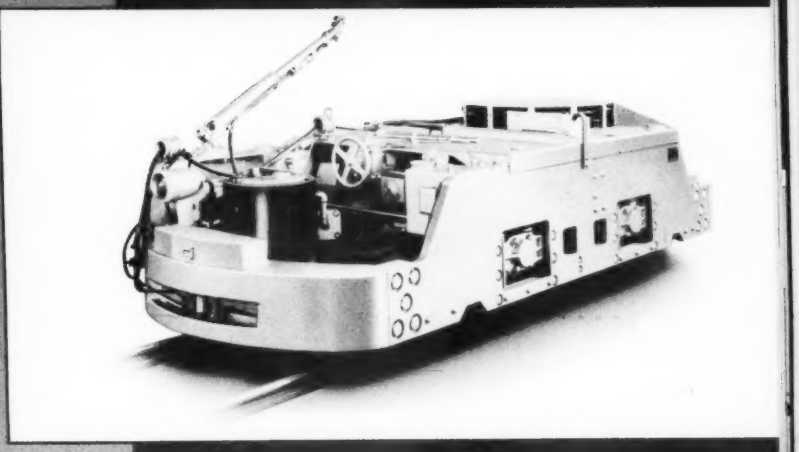
WILL FACILITATE YOUR PRODUCTION LATER

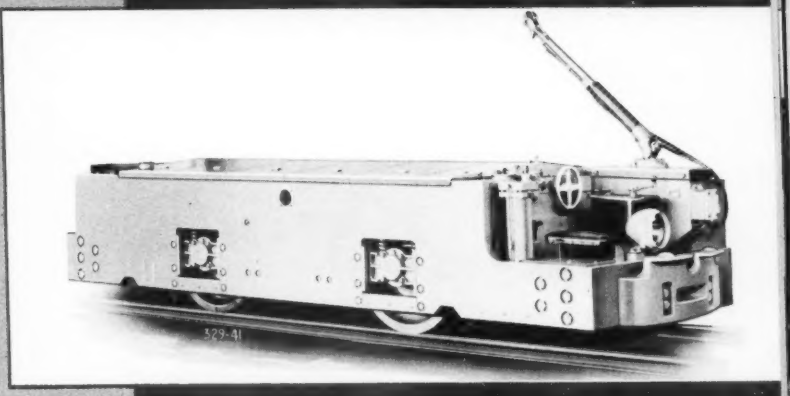
LOCOMOTIVES • • • MINE FANS

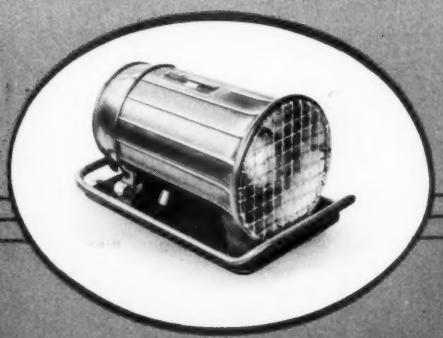
LOCOMOTIVES—A type and size for every mine transportation service containing advanced mechanical refinements for dependable performance and low cost maintenance. Haulage and gathering units (shown at right)—trolley, cable reel and storage battery types—and trammers.

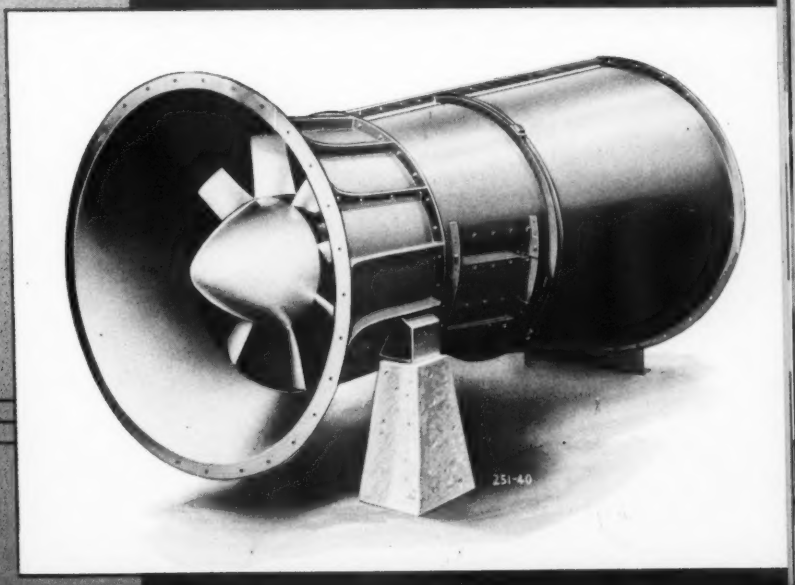
VENTILATION—Maximum efficiency—compact design—safe working conditions—increased employee comfort—accelerated production—greater profit . . . all possible when using Jeffrey mine fans. The type 8 H Aerodyne (right) features: high capacity, adjustable blades, low speed, pressures up to 10 inches—will maintain static efficiencies well over 80% over a wide range of duties. (Patented.)

The small Aerodyne Midget tubing blower (Patented) is shown below—a lightweight, streamlined propeller-type unit of flame-proof construction.

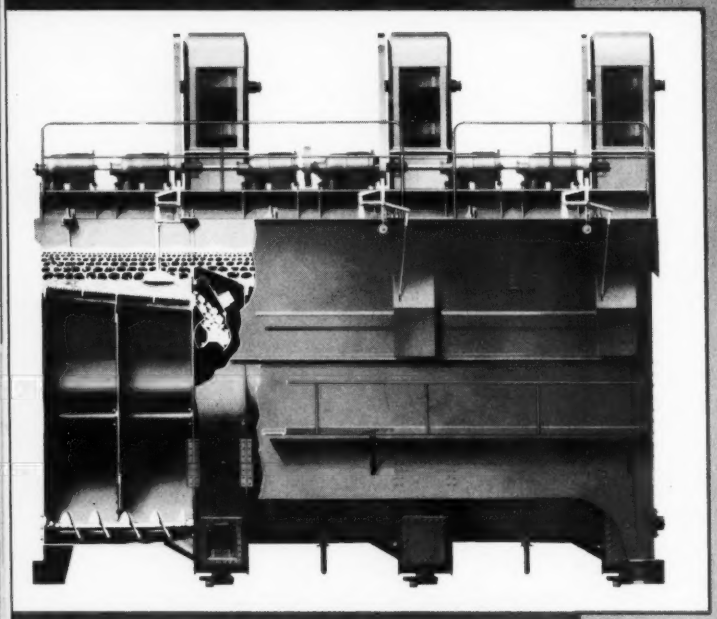






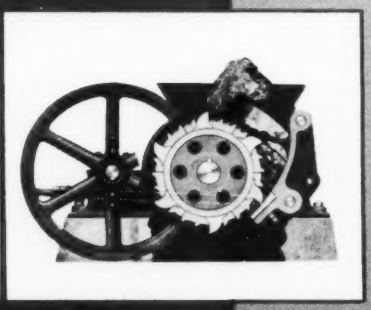


COAL PREPARATION by Jeffrey



JEFFREY JIGS

Jeffrey jigs have been developed to produce a uniform product — high recovery — maximum capacity on a comparatively small investment and low operating dollar. Specially-designed units for preparing small or large tonnages of quality coal. An air-operated (Baum-type) jig (Patented) with six cells is shown left. Note cut-away section to show float control and refuse ejector.

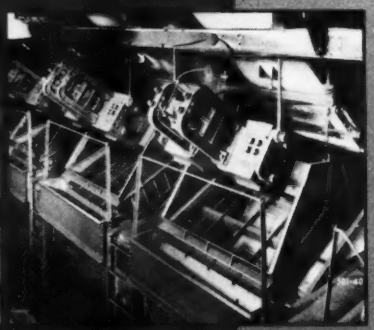


SIZING

Crushers to convert slow-moving lump coal to stoker size in one operation with minimum fines — sizes that are wanted when they are wanted. Selective processing without waste that's what it is. The "Flextooth" (Patented) and single-roll types are shown left.

FEEDERS AND SCREENS

Electric vibrating type — setting new standards in delivering coal to crushers, conveyors and cleaning systems . . . and in sizing. May be totally enclosed — no moving parts — nothing to lubricate — and are constantly adjustable. (Patented.)



CHAINS

Various types for coal cutting, elevating, conveying and power transmission in the coal mine and tipple. Also a complete line of sprockets, gears, pinions, shafting, hangers, etc.

THE JEFFREY MANUFACTURING COMPANY

958-99 NORTH FOURTH STREET • COLUMBUS, OHIO

EXPERIENCES In Briquetting Coking Coal

By J. SHANKS
General Manager
Brazeau Collieries, Ltd.
Nordegg, Alberta, Canada

The Author discusses advances made at the Brazeau Collieries, Ltd., in Canada, and mentions equipment recently installed for producing binderless briquettes.

EARLY in 1925 the Brazeau Collieries, Limited, became interested in briquetting when complaints came from their principal customer that stack losses were excessive, due to a high percentage of fine coal in their mine run.

Oil spraying of the fines was tried but was ruled out as uneconomical and impracticable, because oil in sufficient quantities to be effective caused the coal in the tender of stoker-fired engines to arch over the screw feeder. Solution of the problem was turned over to the University of Alberta.

The research department of the university concluded in its first report, made in 1929, that briquetting should be done, so the Brazeau Collieries, Ltd., installed a plant at Nordegg, Alberta, Canada. It was decided to eliminate the finest coal from the mine run to the extent of 10 percent, briquette it, and return it to the mine run (minus the fines) in the form of an agglomerated fuel. It was not intended to make briquettes of a quality that would be accepted by the commercial trade, but simply to make an agglomerated fuel in the form of briquettes, halves and quarters, that would be dustless and could be burned in the firebox of a locomotive without stack losses.

The company learned that a fairly hard railway briquette (that is, one that would stand handling from the tipple to the railway car, car to coal dock, and dock to the locomotive tender, with a minimum of breakage) could be made with 3 percent of pitch binder. For the last five years 10 percent of such briquettes have been going into railway fuel and today 150 tons of railway briquettes are made daily, over 80 percent of which are whole briquettes.

In 1939 the company entered the market with an ovoid or egg-shaped briquette. Three plants are now in operation. Plant No. 1, a binderless briquette plant, employs the machinery mentioned in Equipment Summary Plant No. I.

EQUIPMENT SUMMARY
PLANT NO. 1

1. A feeding belt, from slack-coal storage bin to the preheater. This belt is driven by a variable-speed motor which controls the feed.
2. A preheater—consisting of a steam-jacketed paddle conveyor—25 ft. long, running at 44 revolutions per minute.
3. A single-shafted, high-speed, 10-ft.-long paddle mixer (made by Komarek-Greaves & Co., Chicago, Ill.).
4. A 9-ft.-high vertical double-shafted fluxer (made by Komarek-Greaves & Co., Chicago, Ill.).
5. A tempering conveyor of the paddle type, 25 ft. long by 20 in. diameter.
6. A 10-ton-per-hour press of English design making 1.8-oz. briquettes—rolls 28 in. diameter, speed 10 revolutions per minute.
7. The pitch supply is controlled by a Blackmer pump driven by a variable-speed motor.
8. Briquettes from the press are screened before being deposited on a 160 ft. long 6 ft. wide cooling escalator. The speed of this is 12 ft. per minute.

No. 2 plant has the same units as above but the press is of Belgian make and is of a rather unusual design. The gears are placed on the center of the shaft with the rolls on each side. There are four separate rolls, each 36 in. diameter, and have 11 revolutions per minute. The cooling escalator at this plant is of woven-wire construction, manufactured by the Audubon Wire Cloth Corporation, Philadelphia, Pa. Briquettes produced here weigh 1.8 oz.

Plant No. 3 is a binderless plant and was recently started. It was manufactured by Komarek-Greaves & Co., Chicago, and has a capacity of 5 tons per hour of 1½-oz. briquettes of an ovoid shape. Equipment in this plant is listed in Summary No. 3.

EQUIPMENT SUMMARY
PLANT NO. 3

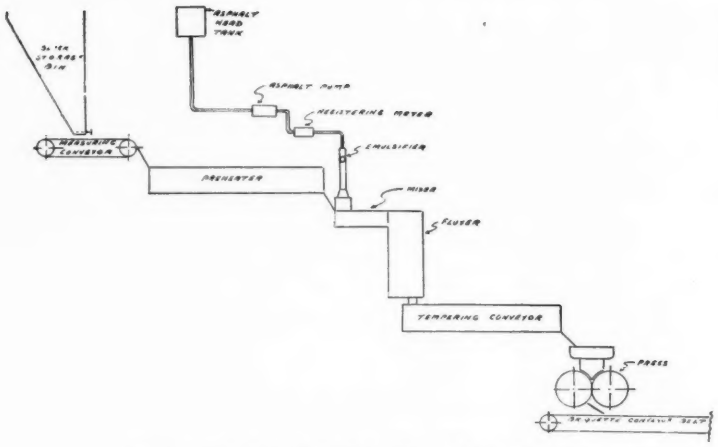
1. Elevator feeder from dust bin to hammer mill.
2. Hammer mill on top of surge bin.
3. Surge bin feeding preheater.
4. Double-shafted preheater, 24 ft. long—heated by flue gases from a Dutch oven.
5. Over-feed return conveyor to paddle feeder. Feed regulated by slide gate in hopper.
6. Paddle feeder superimposed on screw feeder to press.
7. Komarek-Greaves binderless press. Capacity 5 tons per hour—75 hp. motor drive.

In a summary of another report, made in February, 1935, the research department of the University of Alberta stated: "This and the previous investigation (1929) have shown that Brazeau coal is a coal easy to briquette. The percentage of binder required will, however, be influenced by the sizing of the coal, by the briquetting plant available, and by the control of the operation."

At least 5 tons of dust per hour was collected from the dry-cleaning plant collector and made available for briquetting. Screening test of this dust is given in Table I.

TABLE I
Dust Screen Test

Mesh		Percent retained on screen	Cumulative
Equals 1/16 in.	10	0.0	0.0
	14	0.6	0.6
Equals 1/32 in.	20	1.5	2.1
	28	3.0	5.1
Equals 1/64 in.	35	7.9	13.0
	48	22.7	35.7
	65	28.9	64.6
	100	14.7	79.3
	—100	20.7	100.0



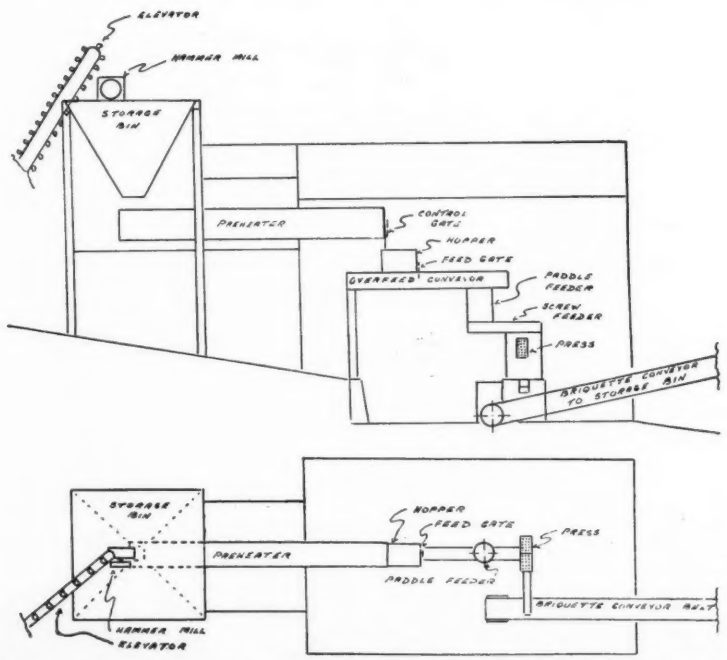
Diagrammatic flow sheet of the No. 1 briquetting press

It will be noted 80 percent passes through a 20-mesh approximately 1/32-in. screen. Experiments with sizes of coal, different temperatures of pitch supply, and temperatures of mix to the press were made. One conclusion reached from our experiments was that many popular ideas concerning the practical range of these elements are wrong.

In one instance briquetting was tried with the temperature of the pitch entering the emulsified at 250° F., and later increased to 310° F. A decided improvement was noticed. The coal is heated in the preheater to a temperature of 175° F. Increasing the temperature of the binder to 310° F. increased the temperature of the feed to the mixer proportionately. The binder being more fluid, better mixing resulted.

The temperature of briquetting was originally set at 145° F. This temperature was increased to 160° F. and gave better results. This could be expected, as the higher the temperature of the mix in the press the more readily will the binder flow or be pressed into the voids.

It has been stated that the optimum sizing of coal for any plant is probably the sizing which undergoes the least crushing during mixing and pressing. It has been proved that crushing does take place in the process of making briquettes, but if the coal is first crushed to its optimum size for briquetting no further crushing can take place.



Elevation and plan shows the arrangement of equipment employed in the binderless plant

Briquettes were made from the fine dust coal of which screen analysis is shown in Table I, with 7 percent of binder. After 24 hours seasoning they withstood a pressure of from 200 to 300 lbs. A test was made with the same percentage of binder on the same press with coal having a screen analysis shown in Table II.

TABLE II

Screen size	Pet. weight
Plus 4-mesh	0.3
48-4	73.0
100-48	22.4
0-100	4.3

These briquettes were not as strong as the others made from finer coal. They crushed under a pressure of from 150 to 225 lbs. Some in the industry have said that the sizing of coal has a large influence on the quantity of binder used, mainly because of the greater area to be coated. This has not proved correct in practice. Fine grinding is the main requirement in successfully making binderless briquettes. Is it not possible that cohesion to some extent takes place with the fine coal in ordinary briquetting mixtures without binder?

Briquettes with a 50 percent mixture of the coals of screen analysis in Table II and with 7 percent binder were made with the results shown in Table III.

TABLE III

Briquettes With Seven Percent Binder		
Weight per cu. ft.	pounds	43.5
Compressive strength before breaking by Komarek-Greaves testing machine	pounds	250
Drop shatter test:		
Stability index on 1½-in. screen		87.5
Fines through ½-in. screen		2.5
Tumbler test (F.R.L.):		
Stability index on 1-in		97.7
Dust by abrasion through 1/16-in.		2.3
Analysis		
Moisture	percent	1.1
Ash	do	11.2
Volatile matter	do	21.1
Fixed carbon	do	66.6
Calorific value, B.t.u.	pounds	13,840
Briquette Binder		
Flash point		400° F.
Softening point		135° F.
Penetration at 77° F		10
Ductibility at 77° F		C.M.S. 5
Total bitumen		98.5 pct.

At Brazeau, Imperial Oil Company's Imperial Briquette Binder is used. It is of uniform quality and has the characteristics listed above.

Thorough mixing is essential to

make a uniform product. Mixing was formerly done in long paddle mixers revolving at 40 revolutions per minute. Modern practice is to have smaller, shorter mixers, running at about 90 revolutions per minute.

More recent practice is to emulsify the pitch with live steam before it joins the coal in the mixer. By emulsification the bulk of the binder is increased 10 times and its viscosity decreased. By increasing the volume of the flux there is a better chance of all particles of coal receiving a coating of binder.

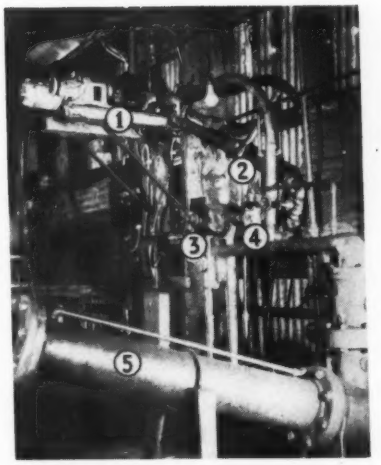
At Brazeau the molten pitch flows from a head tank through a steam-jacketed pipe to a small Blackmer pump driven by a variable-speed motor. The pitch passes on its way to the emulsifier through a filter and a Bowser registering meter. The supply to the emulsifier is regulated by a gate-type valve, having a micrometic slide for fine regulation. The asphalt binder is heated to 310° F. and emulsified by 75 lb. pressure steam. Steam at this pressure has a temperature of approximately 310° F.

Opinion has been held by others that the temperature of the mixture entering the press should be fixed in relation to the melting point of the pitch used. This is not necessary. The only thing governing is possible degradation of the briquettes in falling from the rolls on to the delivery belt. If the mixture is too hot the briquettes will be too soft to withstand the drop. The temperature of the mix going to the press should be as high as possible, consistent with producing whole and uniform briquettes, and can only be fixed by trial.

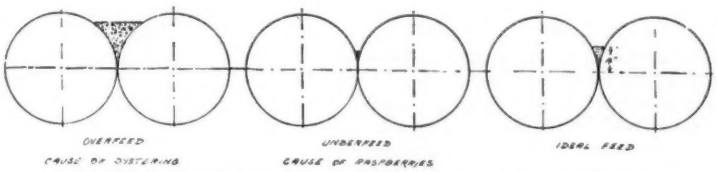
Good briquettes are obtained with a pressing temperature of 160° F. The briquette delivery belt passing under the press rolls cannot very well be nearer the bottom of rolls than 6 in. With 28 in. diameter rolls the distance from the point of contact of the rolls to the belt is 20 in. This distance or fall can be cut in half by placing an inclined rubber chute at 45° to the discharge belt in the direction of delivery. (See sketch.)

Uniformity in feed is most important. It is not easily maintained in operating a commercial press. If the flow of the mixture on to the rolls is uneven—say, thick in the center and thinning toward the edges—the briquettes will lack uniformity. Briquettes made in the center of the rolls will perhaps be very good and those made on the outside be very poor, through lack of pressure caused by partially filled cups. These poor briquettes are rough in appearance and are known to the trade as "raspberries." A good well-pressed briquette, made in nickel-steel rolls, should be neat and shiny in appearance. If the press is overfed the briquettes will be shiny, due to ample pressure, but some will split or show a slight opening along the line of cementation of the halves. This tendency to open is due to sticking or reluctance of the briquettes to leave the cups in the rolls. It is known to the trade as "oystering." This can be overcome to some extent by coating the rolls while in operation with a fine mist spray of soapy water. An even ribbon-like feed, the width of the press rolls, is ideal but difficult to achieve.

At Brazeau, on No. 1 machine the feed is maintained through a flat chute over the width of the rolls. The flow is broken up or evened by passing it through hinged lifting fingers of round iron. At Canmore, the technical staff have developed a concave vertical chute the width of the rolls. It is made of highly polished bronze with a throat opening sufficient to keep the feed fixed at the proper amount and ribbon-like in shape.



Photograph shows important parts of equipment for making briquettes. (1) Variable speed motor and asphalt pump; (2) By-pass; (3) Registering meter; (4) Strainer; (5) Emulsifier



Uneven feed to the rolls causes "oystering" and also produces "raspberries"

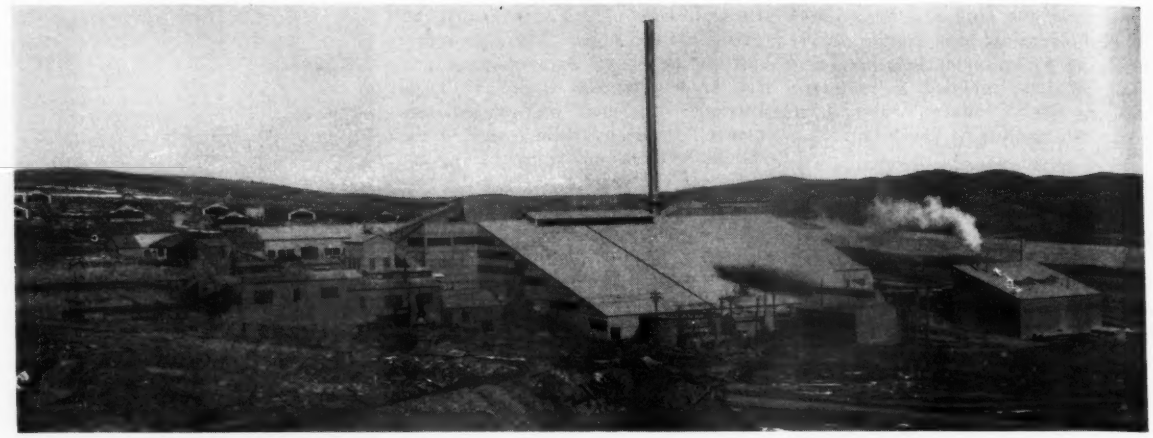
The No. 2 Belgian press has a paddle rotating at 103 revolutions per minute in a wrought-iron cylinder placed above the apertures to the press. This action keeps the mix in a state of semi-suspension. The particles fall through the apertures to the press rolls in the form of a shower. This feed arrangement is the best the author has seen in operation. No trouble is experienced, and it is being installed on other machines.

Binderless Briquetting

This process is still more or less in the experimental stage, but good commercial briquettes can be made providing a good briquetting coal is available. The company recently started briquette production with a machine manufactured by Komarek-Greaves & Co., Chicago. About 95 percent recovery of whole briquettes from this machine are being made.

Binderless briquettes are pressed at a temperature of about 300° F. The coal must be finely ground. At least 60 percent should be 100-mesh, of the remainder nothing should be larger than 40-mesh. The pressure used is several times that used in making briquettes with pitch binder.

It will be noticed that the No. 1 press rolls are 28 in. in diameter and run at 10 revolutions per minute, and No. 2 press rolls are 36 in. in diameter and run at 11 revolutions per minute. The periphery speeds are as 280 to 396. It is a matter of argument—what periphery speed is best suited to making briquettes. Some operators have increased the speed on the rolls to meet increased demand for their product successfully, while some others have done the same thing unsuccessfully. In the author's opinion it is worth while when installing a briquetting press to make provision for easily changing the speed of the rolls one way or the other in order to obtain the best results at a maximum output.



Considerable equipment housed in several buildings produces efficient recovery of microscopic size gold particles at this large treatment plant

Roasting Improves Gold Recovery at Getchell Mine

The sulphide ore passes through a pair of rotary kilns 260 ft. long, that provide economic gold extraction and facilitate collection of arsenic

By FRED WISE
Superintendent
Getchell Mine, Inc.
Redhouse, Nev.

THE Getchell Mine is a gold producer in the old Potosi Mining District, Humboldt County, Nev., 43 miles northeast of Winnemucca, and 16 miles north of Redhouse, a station on the Western Pacific Railroad, serviced by both the Southern Pacific and Western Pacific. Mail, freight and express are received at this point and trucked to the mine over a private road.

The vein occurs along a fault scarp occasioned by a granite intrusion in lime shale beds and at the base of the Osgood Mountains. Two types of ore occur; completely oxidized ore and sulfide ore. The line of demarcation between the oxidized and sulfide zone is sharp, and at a nearly constant horizon. The oxidized ore has been virtually mined out and sulfide is now being treated. In the sulfide zone three types of ore are found. The main hanging wall fault gouge, which varies from 10 ft. to 50 ft. in thickness, is partially mineralized, and mined to an economic hanging wall within itself. Underlying the gouge is a band of highly siliceous ore varying in thickness from 10 to 20 ft. underlying the siliceous ore occasional bands of partially silicified and mineralized lime shales are found. These vary from a few inches to 10 ft. in thickness. The foot wall, where encountered to date, is a hard lime shale characterized in places by wollastonite. The hanging wall of the sulfide ore is stripped and ore is later mined in 20 ft. benches. A power shovel digs the soft ore and the siliceous ore is drilled by a wagon drill unit. Vertical holes are drilled on 20 ft. centers, and blasted. The soft gougey ore and the silicified ore are mined and fed separately to the mill.

Three primary ore bins, one each for oxide ore, gougey sulfide ore, and siliceous sulfide ore are provided and, in addition, space is allowed near the bins for stock piling 2,500 tons of oxide ore, 1,000 tons of gougey sulfide ore, and 1,500 tons of siliceous sulfide ore. Ore is brought to the primary ore bins of the crusher plant by a 60 h. p. caterpillar bulldozer from the three stock piles, as required.

Two 2 cu. yd. diesel driven shovels are engaged continuously on a one shift basis in the pit. Gasoline driven trucks of 6 cu. yd. capacity and diesel powered trucks of 14 cu. yd. capacity are used for ore and waste haulage. Mill operations require that shovels are engaged on ore approximately 25 percent of their time, and on stripping 75 percent.

The gold at this property occurs in microscopic sizes in the sulfide ores, both in the free state and locked in minute pyrite and arsenopyrite particles. It has been found through the microscope that the bulk of the free gold is coated with some substance, to date unidentified, thought to be an insoluble iron compound. A proximate analysis of the sulfide ore is: 71.5 percent SiO_2, 4.68 percent Fe, 9.28 percent Al_2O_3, 2.14 percent CaO, 2.36 percent As, 2.71 percent S, 7.33 percent unaccounted.

Arsenic occurs as realgar and orpiment, and is secondary to gold deposition. Other sulfides identified, and occurring in minor quantities, are pyrrhotite, chalcopyrite, chalcocite, covellite, galena, Sphalerite, and stibnite. Electrum has also been identified.

Test work indicates that neither flotation nor direct cyandidation will

produce a tailings low enough to be discarded. The arsenic, which is detrimental to cyanidation, can be eliminated by flotation. The residual product, however, is not amenable to economic extraction by direct methods. A roast is, therefore, required prior to treatment in order to secure economic extraction by cyanidation. Roasting at the Getchell Mine accomplishes three things: the insoluble coating on the free gold is converted to a soluble state; the gold-bearing fine sulfides are oxidized, and the bulk of the arsenic is eliminated.

Microscopic work on the calcined cyanide residues shows micron size gold included in 800 mesh sulfides which, in turn, were included in 300 mesh gangue particles. Gold in such fine grain sizes indicates that an ultimate tailing cannot be reached until a dead roast is attained. Dead roasting and metallurgical tests, as well as plant practice, all indicate that a certain percentage of value cannot be recovered even by going beyond economic practices. On this basis metallurgical results are viewed in the light of tailings assay rather than percentage extraction.

A wash is required after roasting before going to cyanidation. Either hot water, a weak trona solution, or a weak sulphuric acid solution wash is suitable. To date, however, hot water has been used as being the best from an economic standpoint. Washing dissolves the coating from the free gold, removes soluble sulfates and sulfites, ferrous compounds, and other cyanides formed during roasting. The washed calcines are then amenable to cyanidation by standard methods.

Rotary kilns were selected for roasting the sulfide ores. The selection was based on lower capital cost, greater tonnage per unit area and per unit cost, and possible lower operating cost with comparable results to any other type roaster. The original unit consisted of a 7 by 100 ft. rotary kiln capable of handling 100 tons per day. The operation of this unit during 1938 and early in 1939 supplied data to justify a larger unit.

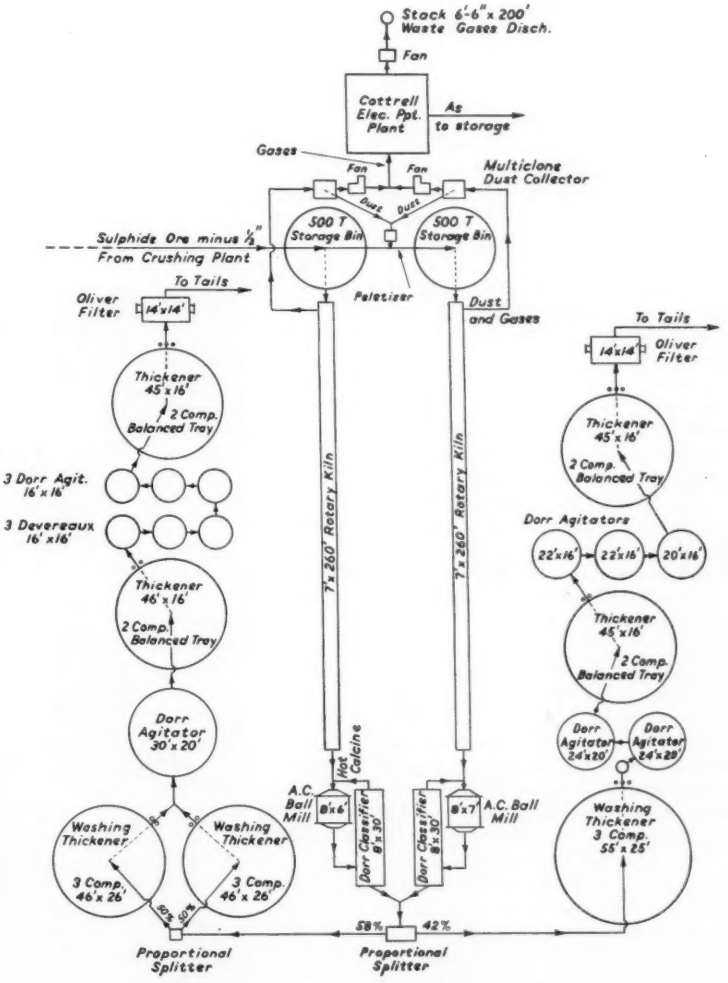
The new unit is a 7½ x 260 ft. rotary kiln, capable of handling 500 tons per day. Good, but not entirely satisfactory, results are first obtained. A small test kiln, 4 x 45 ft., was installed and run in parallel with the large unit. A new method of heating was applied, which gave encouraging results. Sulphur elimination on the test unit reached 95 percent on a 2.5 percent S head, as against 60 percent on the larger unit, with comparably better metallurgical results. A second 7½ x 260 ft. kiln is now installed and operating, incorporating the new firing system, which has improved results.

Milling Practice

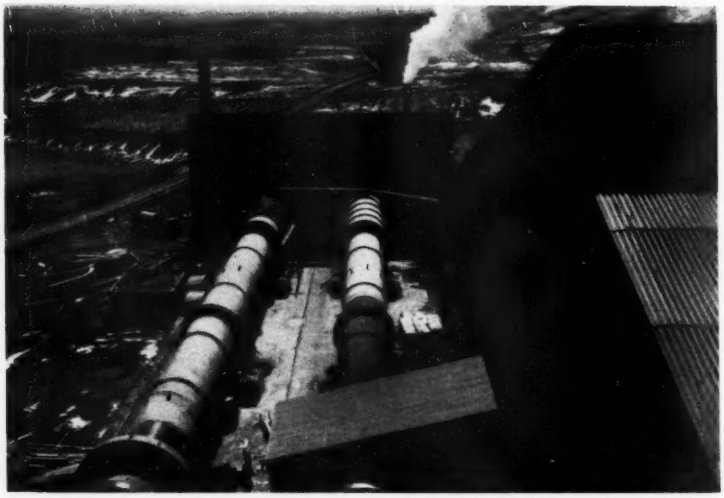
Sulfide ores are handled in two sections in the crusher plant. The gougey sulfide ore, containing from 5 to 15 percent moisture, is fed to a 3 ft. 6 in x 6 ft. Symons Type K Grizzly feeder with bars spaced at 3 inches. The plus 3-in. product passes through a 20 x 24 in. Dixie Hammer mill. The discharge of the hammer mill joins the minus 3-in. grizzly product and goes directly to a 7 x 100 rotary kiln dryer. At 2 r.p.m. it handles 50 tons per hour, drying to minus 4 percent moisture, with which moisture content the gouge loses its plasticity and can be crushed. The dryer is oil fired, using Pacific Specification 300 fuel oil. Dried gougey ore joins the siliceous sulfide ore at the Symons screen.

Siliceous sulphide ore is fed to an 18 x 36 in. type H Traylor jaw crusher set to 2½ in. Discharge is fed to a 4 x 8 ft. Symons Type K rod deck screen with ½ in. spacing. Undersize goes to the roaster storage and oversize to a 3 ft. type TY Traylor fine reduction crusher. Discharge is in closed circuit with the 4 x 8 ft. Symons screen. Roaster feed screen analysis is 18 percent plus ½ in.—19 percent plus 4 mesh—63 percent minus 4 mesh.

The crusher plant product is fed by conveyor to a 400-ton bin located at the feed end of the roaster. A 3 x 6 ft. pan conveyor set under the bin feeds into a 12 x 12 in. cast iron pipe set on a 50 degree angle. This pipe is set through the kiln feed hood



Plan of flow sheet showing location of the long rotary kilns



Two rotary kilns are fed with crushed ore from the building housing the ball mills and classifiers

directly into the kiln. Pan conveyor and pipe mouth are totally enclosed to prevent air leakage into the kiln.

Kiln Operation

The kiln is a 7½ x 260 ft. Traylor Rotary kiln lined with 6 in. of fire brick backed by 2½ in. of Superfex insulating blocks. Inside diameter of the kiln is 6 ft. It is set on a slope of ⅜-in. per foot, and turns 1 1/3 r.p.m. The gas flow is counter to the ore flow. The kiln is fired with a Pan-American Super-Mogul Turbine oil burner, burning Pacific Specification 300 fuel oil, preheated to 160 degrees F.

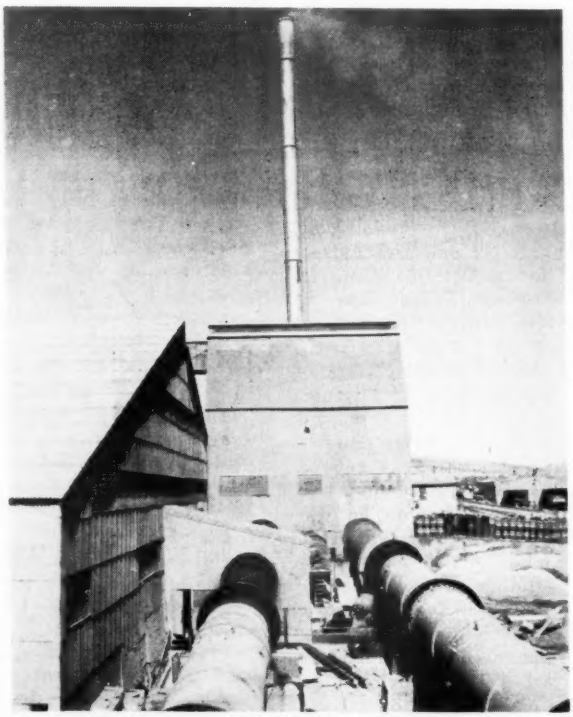
Ore flow through the kiln is nearly one foot per minute; total time of rock in kiln being 4½ hours. Laboratory test work indicates ore should be brought to 1,000 degrees F. and held at, or above, that temperature for one to two hours to obtain best metallurgical results. Heating above 1,400 degrees F. for any length of time proves detrimental to extraction. In practice, rock is brought up to 1,000 degrees F. in the first 200 to 210 ft. of the kiln. From that point to the discharge it reached 1,300 to 1,400 degrees F. Metallurgical results as well as laboratory work, indicate this length of time at 1,000 degrees F. is not sufficient and the new kiln installation has been designed to overcome this.

Kiln gases are discharged from the feed end at a temperature around 450 degrees F. If allowed to drop below this point arsenic starts to come down as fume and causes clogging of the gas discharge system. Hot gases pass through a 9 in. x 30 tube Western Precipitation Corporation multiclone, and thence through a No. 80 Norblo fan. The latter controls gas volume through the kiln. The multiclone collects 90 to 95 percent of the plus 5 micron dust which contains 98 percent of the value. The collected dust is nodulized and reintroduced to the kiln with the primary feed. The discharge of the Norblo fan passes into a mixing chamber where the gas is cooled to 250 degrees F. and conditioned with water. Conditioned gases pass through a two-unit Cottrell precipitator, where arsenic is collected as arsenic trioxide. A No. 110 MX Buffalo fan pulls through the Cottrell unit and discharges waste gases to a 200 ft. high steel stack.

Average kiln operating data for a period of seven months follows:

Rock temperature discharge	1,300	deg. F.
Sulphur in heads	2.91	percent
Sulphur in kiln discharge	1.22	"
Sulphur elimination	58.1	"
Arsenic in heads	2.01	"
Arsenic in kiln discharge	0.32	"
Arsenic elimination	84.1	"
Oil consumption (gals.)	6.55	per ton

Roasted ore discharged from the kiln at 1,300 degrees F. is fed through an 8-in. steel pipe directly to the ball mill scoop box. The scoop box is fairly tight, and is kept under suction by a No. 30 Buffalo fan drawing 12,000 cu. ft. per minute of air. Part of the air is drawn through the ball mill and the balance through a classifier sand return launder and leaks in the scoop box hood. The air from the hood, containing steam and dust, passes through a Western Precipitation slot type scrubber to remove the dust, thence through a dehydrator, where a high percentage of water is reclaimed, and fed back to the grinding circuit. The whole discharge system is acid, and where steel is used it is protected by a liberal coat of "Corresco" acid resistant paint.



The ore is roasted in the kilns about 4½ hours

Grinding by Grate Mill

The grinding unit consists of an 8 x 6 ft. Allis-Chalmers grate mill in closed circuit with an 8 x 30 ft. Dorr Multizone classifier. The classifier operates at a 7 to 1 circulating load. The overflow is:

Plus	65 mesh	.....	1.43	percent
Minus	65 plus 100	.....	7.57	"
Minus	100 plus 150	.....	15.15	"
Minus	150 plus 200	.....	12.15	"
Minus	200 plus 325	.....	11.29	"
Minus	325	.....	52.41	"

Grinding and classification are made in fresh water, and it is in these units that a hot-water wash is introduced. Ball-mill discharge is 75 percent solids at a temperature of 190 degrees F. Classifier overflow is 33 percent solids at a temperature of 140 degrees F. Classifier overflow is pumped by a 3-in. rubber-lined Wilfley sand pump to a 55 ft. diameter by 25 ft. deep 3-compartment Dorr Washing Thickener. A 2 to 1 fresh-water countercurrent wash is applied in this unit. Overflow wash water, containing soluble sulfates, sulfites, iron compounds and small amounts of arsenic, is used to sluice tailings. Due to the incomplete roast, sulphur continues to break down after the roast. This is not true of the iron and, based on soluble-iron compounds, the replacement efficiency in the wash thickener is better than 95 percent. Washing thickener overflow, at 65 to 70 percent solids, is sent to the slime-treatment plant.

Thickener underflow without dilution is agitated in a 24′ x 20′ Dorr agitator equipped with secondary blow pipes. In addition to the conventional Dorr mechanism, 20 ¾-in. pipes are placed equidistant around the outside periphery of the tank and extended 12 ft. below the level of the pulp in the tank. A Root blower pumps 300 cu. ft. per minute of free air at 7-lb. pressure into the pulp. This adjunct to the Dorr agitation gives excellent aeration and lowers KCN consumption. Overflow from the first agitator goes to a second 24′ x 20′ Dorr agitator also equipped with blow pipes. Pulp is diluted to 1.25 gravity with mill KCN solution, and fresh KCN and milk of lime are added to maintain a solution strength of 0.5 KCN and 0.5 CaO. About 90 percent of the total extraction of the sulfide ore is attained in the primary agitator. Overflow from this agitator goes to a 30-ft. diameter by 18-ft. Dorr 3-compartment tray thickener. Overflow from this thickener goes to pregnant solution. Underflow at 55 percent to 60 percent solids is repulped with barren solution and agitated in three 16′ x 16′ Devereau agitators. Stage dilution with barren solution is practiced through these agitators. The first one is run at 1.30 gravity, the second at 1.25, and the third at 1.20.

Plant practice experiments showed sulfide circuits were void of free oxygen. The lack of free oxygen in the circuits increased KCN consumption and hindered gold dissolution. Utilization of the Root blower in the primary agitator circuit, and stage dilution with barren solution in the secondary agitator circuit, served to maintain the presence of traces of free oxygen in these circuits. Lead acetate in the amount of .3 lb. per ton of ore is added to the primary circuit. This eliminates soluble sulfides of arsenic and other metals. Arsenic entering KCN treatment is .29 percent; arsenic in plant residues is 28 percent. The residual arsenic from the roast is not soluble and probably occurs as arsenopyrite. Sulphur entering KCN plant is 1.29 percent; sulphur in plant residues is 1.25 percent. Soluble sulphur is encountered in plant as sulpho-cyanides. To date very little trouble has been experienced due to foul solutions.

The secondary agitator circuit overflows to a 45-ft. diameter by 16-ft. Dorr thickener. Overflow from the thickener goes to mill solution. Underflow, at 50 percent to 55 percent solids, goes to a 14 x 14 ft. drum-type Oliver filter. Filter cake is washed with barren solution and the filter effluent returns to mill solution. Discharged filter cake, at 20 percent moisture, is repulped with wash thickener overflow and sent to tailings ponds.

Precipitation by Merrill-Crowe Process

The standard Merrill-Crowe simultaneous clarification and precipitation system is used for precipitation. Four tons of solution are precipitated for each ton of ore treated. Pregnant solution from storage is drawn through 60 clarifying leaves into the Crowe vacuum tower. Clarifying leaves, which are 8 ft. by 5 ft., are precoated with Hi-Flow Supercel. The Crowe vacuum tower underflow, with .03 lb. zinc dust per ton of solution added, is pumped by Kimball-Krogh pumps through three 26-frame 36-in. Shriver presses. Discharge from these presses is metered through three Buffalo solution meters to barren solution storage.

Precipitate collected in the presses is cleaned out periodically. The presses are blown with high-pressure air for two hours, then opened, and precipitates removed by hand. The precipitate as removed contains 40 percent moisture and is charged into a 6-ft. diameter by 8-ft. redwood tank equipped with a wooden paddle agitating mechanism. When total precipitate is charged, concentrated sulphuric acid, to the amount of 1¼ lb. of acid per pound of dry precipitate, is added. No water, other than the moisture content of the precipitate, is used at this point. After adding the sulphuric acid, the agitator mechanism is started. Commercial sodium nitrate is added in small batches and the reaction allowed to die down before addition of each successive batch. Addition of nitrate continues until silver appears in solution when tested with sodium chloride solution. When silver appears in solution the tank is filled with hot water and agitated two hours. Zinc dust is added until by test all silver has been precipitated. The charge is drawn off through a 24-leaf 24-in. Shriver press and washed with hot water in the press. The press is then blown with high-pressure air, opened, and cleaned by hand. Precipitate runs about 25 percent moisture. Precipitate weight by acid treatment is reduced about 50 percent and it is fluxed with 4 percent nitre, 10 percent SiO_2, 6 percent soda ash, 20 percent borax glass, and 5 percent hematite. Melting is done in two Monarch-Rockwell furnaces. Bullion produced runs 940 to 950 fine in gold and 45 to 55 fine in silver.

Blasting in the open pit is commonly prepared by digging "coyote holes"

FLUORESCENT LIGHT— The Prospector's New Tool

A modern portable ultra-violet lamp aids him in quickly determining presence of scheelite and other minerals. Underground development in tungsten mine better planned by its use.

By RICHARD HAMILTON
Los Angeles, Calif.

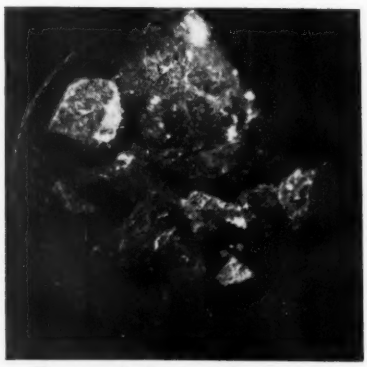
NO figure has been more important in the history of mining than the traditional and obscure prospector who, outfitted with a pick and shovel, a gold pan, a grubstake and a burro, has been responsible for discovering many of the nation's leading mineral deposits. As time has passed, the tools of his trade have been improved, but it is the diligent and careful search of the prospector that is largely responsible for new ore finds. Today he has a broader knowledge of geology and mineralogy and he searches for important ores, useful in the Nation's war effort.

One of the most useful new tools, added to the pack of the prospector, is the fluorescent lamp. This lamp, developed only in the past few years as a conveniently portable prospecting implement, consists essentially of a power source (batteries) and a lamp which emits ultra-violet rays. These rays have the peculiar property of causing certain minerals to glow or fluoresce brilliantly; and each mineral which possesses this fluorescent quality glows with a light of distinctive color. Thus willemite (zinc silicate) glows a brilliant yellow; calcite, a beautiful pink; and scheelite (calcium tungstate) emits a bright yellow-orange light. A collection of these and other fluorescent minerals under the ultra-violet ray is a fascinating picture, never to be forgotten.

The portable fluorescent lamp has proven to be particularly useful in detecting deposits of tungsten (scheelite). When prospecting on the surface it is used at night, as the fluorescent glow can easily be seen. During the last two years, the fluorescent lamp has been responsible for the location of at least 50 new prospects, several of them developing into commercial mines. It has enabled marginal producers to undertake development that has resulted in increased production.

The fluorescent lamp, when first introduced, was distrusted by many tungsten operators. Even after perfection, its advantage in mine exploration was not fully recognized. The lamp reacts on calcite, zinc, molybdenum and other minerals quite often associated in a matrix of scheelite ores. Errors many times resulted because these other minerals also exhibited fluorescence. Today, however, the lamp is more widely employed in aiding tungsten mine development, in ore selection and, most important, in prospecting and locating virgin tungsten deposits.

A basket of ore in daylight that contains an average of 3 percent tungsten



The same basket in darkness showing the light spots indicating the presence of scheelite, brought out by the ultra violet light

The demand for the strategic mineral and the increased unit price of tungsten has created, in the last two years, great interest among workers, prospectors of the old school, neophyte geologists and many others. They have gone out into their native hills armed with the fluorescent lamp, and some have found new discoveries.

The prospector of today is no amateur. He confines his search to granite-schist contacts, to limestone beds in granite areas and to regions surrounding successful mines. Armed with these data, he proceeds to his chosen area and looks over the terrain in the daylight. When night comes, he traverses the creek beds, gullies, and exposed bedrock, his lamp probing the ground beneath him. It takes only one or two bits of float or a tell-tale fine concentration in a creek bed, and he is after the lode from which it has come. It is seldom that he fails to locate the source, for the little lamp misses nothing.

Sixty miles east of the boom town of San Diego, Calif., lie the Laguna Mountains, a granitic series striking north and south. In these mountains occurred an interesting bit of modern prospecting. A young San Diego County rancher, Eugene Rice, uncovered what is believed to be one of the best tungsten belts of the state. Young Rice always believed that tungsten existed in this range, and he penetrated deep into the Lagunas armed with his fluorescent lamp field equipment, and much confidence. His first discovery was a non-commercial scheelite deposit that lay on the west side of a tremendous aplite dike striking north. Rice found four of these

Eugene Rice examines a piece of tungsten ore on the property he discovered with the help of the ultra violet light

deposits along an area stretching 25 miles from the Mexican border on the south, to Mason Valley in the desert to the north. They cannot be called mines as they only have location holes as development, but they are considered to have possibilities. Rice's fifth deposit has developed into a mine.

High in the Sierras, near Bishop, Calif., lies the Tungstar mine. It is located at an altitude of 11,980 feet, and just below the crest of Mt. Tom, 20 miles west of Bishop. Deposits of this area were known for several years to exist. In this area the fluorescent lamp played its dramatic part and enabled examining engineers to determine Tungstar's worth, which sampling alone could not do.

The ore is brought to the 75-ton mill over a 13,000 ft. aerial tramway, which is of rigid steel tower construction, estimated to cost $165,000. The unit was designed by R. N. Riblet of Spokane, Wash., and built by the Western Knapp Engineering Company of San Francisco. This firm also constructed the mill, following metallurgical testing by Superintendent W. B. Hughes and his staff of technical assistants.

Twenty-one miles from Bishop is the nation's largest tungsten mill, operated by the United States Vanadium Corp. Production here started in October, 1941, and many small operators use the facilities on a custom basis. The 1,300-ton plant utilizes the latest process for tungsten recovery from a complex scheelite ore.

South, from Bishop, one hundred and fifty miles, is Atolia, a mine which in World War I, carried the great load of providing tungsten.

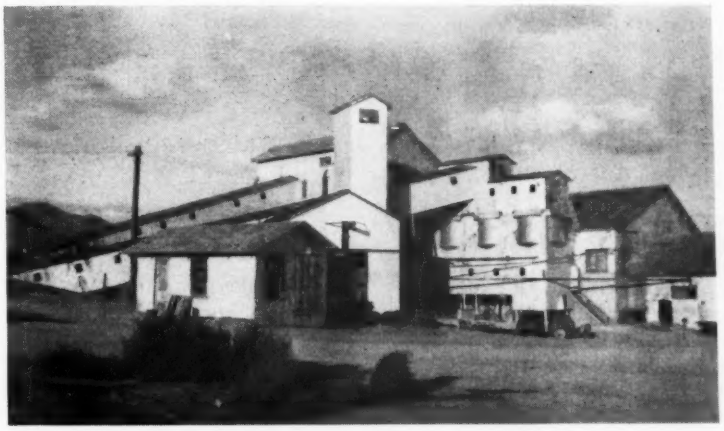
At Darwin, near the renowned Death Valley, E. L. Cord, the auto manufacturer is adding his bit to the ever increasing tungsten output.

Easterly, in the Nevada lime beds, Charles Segerstrom, a Californian, has given his years, his fortune and his beliefs to the creation of a mine. Today, his vision is reality, and in Nevada stands one of the nation's greatest tungsten producers, the Nevada Massachusetts Co., Inc.

The name of Don E. White, of the Federal Geological Survey, has an interesting place among today's personalities, connected with new tungsten mines in the United States. He examined some antimony deposits for the Bradley Mining Co. in the Yellow Pine district, Idaho, in 1939, and his report recommended diamond drilling. This was done in 1940-41 by the Federal Bureau of Mines, and White and Bureau of Mines engineers became curious when they closely examined the diamond drill core and with the aid of the fluorescent lamp found scheelite. This property has now become an important producer.

Prospectors, geologists, and metallurgists have made tungsten important. The father of mineralogy, Georg Agricola, shows his "lupis spuma," a strange unknown white metal. The renowned Swedish chemist, K. W. Scheele, made his "scheele's earth," today better known as scheelite, or the Swedish descriptive word "tungsten" (heavy stone). Mushet, the Englishman, made tungsten steel in 1866 but died before he could reap the rewards of his discovery. Taylor and White, two Americans made their investigations in 1900 and thus to America goes the credit for modern high-speed steel. On a great plaque in an office of the Bethlehem Steel Company is written this formula, almost identical with our tool steel today—a tribute to the two American metallurgists. Tungsten, 18 percent. Chrome, 6.5 percent. Carbon, .70 percent. Manganese, 1.85 percent, and Silicon, .15 percent.

A small washing and tabling operation producing tungsten concentrate



A modern tungsten mill near Atolia, Calif.

With the **COAL DIVISION**

of the AMERICAN MINING CONGRESS

MINERAL COMPOSITION, AND STRUCTURE OF MINE ROOF ROCKS

● *A report to the Subcommittee on Mine Roof Sealing by Paul H. Price and A. J. W. Headley*

THIS report contains as a matter of record the data available to the committee and a suggested tentative classification of roof rock based on this data. Such a classification will lead to a better understanding of roof-rock deterioration and point the way to future investigations on deterioration and its prevention. Naturally, new investigations will require changes and improvements in the suggested classification.

TABLE I

Minerals Present in Roof Rocks

1. Clay Minerals.
   A. Kaolin Group.
      (a) Kaolinite—$2H_2O.Al_2O_3.2SiO_2$.
      (b) Halloysite—$Al_2O_3.2SiO_2.nH_2O$.
   B. Montmorillonite Group.
      (a) Montmorillonite—$Al_2O_3.5SiO_2(Ca,Mg)O.nH_2O$.
      (b) Beidellite—$Al_2O_3.3SiO_2.nH_2O$.
      (c) Nontronite—$Fe_2O_3.3SiO_2.nH_2O$.
   C. Potash-bearing clay mineral, closely related to muscovite mica,—illite.
2. Mica—muscovite—$K_2O.3Al_2O_3.6SiO_2.2H_2O$.
3. Quartz—SiO_2.
4. Siderite—$FeCO_3$.
5. Calcite—$CaCO_3$.
6. Pyrite—FeS_2.
7. Feldspar—$K_2O.Al_2O_3.6SiO_2$.
8. Chlorite—$5(Mg, Fe)O.Al_2O_3.3SiO_2.4H_2O$.

NOTE: After exposure of roof, its composition will change due to oxidation and hydration.

Structure

Shale is supposed to have a laminated structure so that it breaks out easily into thin plates. This is for the most part a primary feature, resulting from the rock having been deposited in thin layers with the flakes of micaceous minerals tending to have their flat surfaces approximately in parallel position. The distinctness with which the laminations are developed varies greatly in different shales and some very fine textured sediments which are called shales are scarcely laminated at all. Such rocks may be called clays or mudstones. Roof shales are not ordinarily homogeneous for any great distance above the top of a coal seam but may contain, in addition to variations in composition and texture of the shale itself, interstratified layers of coal, siltstone, and sandstone. The frequent application of the term "slate" to the roof shales suggests distinct lamination, but direct statements with regard to bedding or lamination do not always appear in publications relating to roof falls or in those relating to stratigraphy of the coal-bearing formations.

Roof shales often contain concretions, which vary in size from a small fraction of an inch up to a foot or more in diameter. These are most commonly composed of limestone, siderite, or pyrite. Mixed with these minerals there may be considerable amounts of carbonaceous matter and of the minerals ordinarily present in the shale. The concretions are likely to have slickensided surfaces and to separate easily from the surrounding shales.

Inclined cracks along which there are slickensides occur in many roof shales and are a source of weakness. The roof is difficult to support near clay dikes or veins, not only because of the break in the roof where the dike passes into the coal but also because there are more slickensides in the roof shale near the dikes.

Joints are rather straight, regular cracks which generally are somewhere nearly vertical in coal and associated rocks. Little information seems to be available about joints in roof shales, but there can be no doubt that the closeness of spacing of the joints and their orientation in relation to the orientation of the rooms and entries has some relation to problem of roof support.

Prevention of falls would reduce mining cost

While the problem of prevention of mine roof deterioration appears to be very general, the number of written discussions is small. It is evident that the problem is many-sided and that no single cause can be ascribed, or no general cure devised, which will apply to all situations.

Two general classes of mine roof falls may be recognized: (1) Falls which result from structural stresses. These include geologic stresses as indicated by the lines of cleavage, fault planes, etc., in the strata of the mine roof and include stresses and strains which result from the mining process. (2) Falls which result from or accompany weathering of the roof strata. The weathering action include temperature and humidity changes, application or removal of water or air to the strata. Falls due to weathering are usually accelerated during the summer months.

The subcommittees suggested classification is presented verbatim.

TABLE II

PROPOSED CLASSIFICATION OF ROOF ROCK FROM THE VIEWPOINT OF THEIR DETERIORATION

	Descriptive	
A. Roof condition (Structure)	1. Stratification	Lamination
	2. Concretions	Type, size, arrangement, quantity
	3. Fossils	Type, size, arrangement, quantity
	4. Jointing and Fracture System	Size, shape, orientation
B. Roof falls	1. Time after mining	
	2. Amount	Daily, seasonal variation
	3. Particle size	
	4. Rate	Continuous, intermittent
	Semi-Quantitative	
C. Degree of consolidation	1. Not consolidated, moisture of coal 50% or more	
	2. Slightly consolidated, moisture of coal 10-19%	
	3. Moderately consolidated, moisture of coal 2-10% and fixed carbon less than 69%	
	4. Strongly consolidated, fixed carbon 69-77%	
	5. Intensely consolidated, fixed carbon 78% or higher	
D. Hydration characteristics	1. Strongly slaking—B to C percent, slakes after boiling five hours, settles out from 24? to an indefinite number of hours	
	2. Mildly slaking—A to B percent, slakes after boiling five hours, settles out in 24? hours or less	
	3. Non-slaking—very slight, if any, slaking after boiling five hours.	
E. Reduction state	1. Non-reducing—has red-ox potential very close to pure water and has a reducing equivalent of O	
	2. Mildly reducing—has red-ox potential from A to B and a reducing equivalent from O to X per pound of rock	
	3. Strongly reducing—has red-ox potential from B to C and a reducing equivalent from X to Y per pound of rock	

Suggested Tentative Classification of Roof Rock

The usual heterogeneity of roof rock makes a clear-cut classification rather difficult, also the meagre data available adds to the difficulty of making an accurate classification. A preliminary classification should be generalized and based on simple, easily made tests which are as accurate as the heterogeneity of the material warrants.

This classification should be based on (1) a description of the structure and texture of the roof rock, (2) the degree of metamorphism (consolidation, compaction) to which the rock has been subjected, (3) the hydration characteristics of the roof rock, (4) the state of oxidation—reduction of the rock.

A measure of the degree of metamorphism of the coal-producing areas is already available; that is, the carbon ratio and the moisture content of the coals. The degree of metamorphism of roof rocks in areas having medium volatile bituminous and higher rank coals could be measured by the dry, mineral-matter-free fixed carbon only, while that of areas with lower rank coals could be measured by considering the fixed carbon and moisture.

The hydration characteristics might be rapidly determined by boiling 100 grams of unground fresh sample in 300 ml. of water for exactly 5 hours, the water immediately poured off and the percent of the original sample suspended in the water determined. The rate of settling of the suspended matter would then be determined to obtain a measure of the particle size of the slaked material. (It might be advisable to fractionally centrifuge to save time.) The percent slaked when plotted against the particle size might produce a banded curve which could be divided into non-slaking, mildly-slaking, and slaking sections. A second sample, dried in air at a fixed temperature and humidity, could be treated in the same way. This classification could be used to indicate the water content of asphalt emulsion which could be used without deteriorating the roof.

It is probable that oxidation of certain constituents of some roof shales is a factor in causing these shales to fall. A test measuring the susceptibility of roof shales to oxidation might prove useful in classifying these shales. Unoxidized materials present in roof shales include:

1. Organic matter—coal and closely related substances.
2. Pyrite (including marcasite and possibly other sulfides).
3. Siderite (ferros carbonate).
4. Silicates containing ferrous iron.

Information on the state of reduction of the shales is not available and of course it is not known whether data on the state of oxidation and reduction would indicate the rate and amount of oxidation the roof rock would undergo in place. Two tests can be made, (1) the oxidation—reduction potential which is a measure of the reducing intensity, and (2) chemical oxidation with, for example, chromic acid, which is a measure of the reducing capacity. The first test should indicate the rapidity of oxygen absorption and the second should be a measure of the total oxygen which should be absorbed. These two tests when plotted might give a banded curve which could be divided into two or more parts, highly reducing, reducing and milding reducing rock.

Charts could be developed so that the classification of a new sample

could be easily spotted from these charts. The proposed classification is illustrated in Table II. Forty-five combinations are possible from such a classification, but it is very likely that no more than half of these need be used in actually classifying roof rock.

The suggested classification should be carefully checked by making accurate and complete physical, chemical and mineralogical tests on some 30 to 50 roof rocks selected for their geologic and areal distribution. If and when this classification is checked by such accurate tests, then relatively simple and rapid tests can be made to classify any roof rock which might be under discussion.

The three mines, on which there is available the most data although far from complete, are the Cranberry mine, Raleigh County, W. Va., the Bureau of Mines experimental mine at Bruceton, Pa., and the McAlester mine, McAlester, Okla. The Cranberry roof rock might be classified or described as a strongly consolidated, mildly slaking, strongly reduced (?) roof rock. The Bruceton roof rock can be classified as a moderately consolidated, strongly slaking, strongly reduced (?) roof rock. The McAlester roof rock can be described as a moderately consolidated, strongly slaking, strongly reduced (?) roof rock.

Part A of the classification will show if the roof rock is stratified; has lenses or balls of pyrite or siderite, tree trunks or stumps, and plant impressions; and if the roof rock has or develops cracks.

Part B tabulates (1) the length of time after the coal is removed in new work until roof falls begin, (2) the quantity of rock which falls daily and during the various seasons, (3) the actual size of the lumps that fall, and (4) rate with which these lumps fall and whether they spall off continuously or fall in bulk with several weeks elapsing between falls at any one place.

Part C is an attempt to measure the pressure which has been applied to the rock by the overburden and by the forces which produce mountains. As a result of these pressures some rocks have been compressed into a much smaller space than others, and hence the rocks have different structural strength and are affected differently by the action of moisture and air.

Part D will give a measure of the effect of water on the roof rock. It appears that the rock goes through a cycle of drying and wetting caused by changes in the quantity of water vapor in the mine air. The resulting contraction and expansion, due to dehydration and hydration, breaks up the roof rock. Where the roof rock stays wet continuously, falls due to water will not ordinarily occur.

Part E measures the rate and amount of absorption of oxygen from the mine air by the roof rock. The relative importance of oxidation as a cause of mine roof falls is yet to be determined, and the method outlined will throw some light on the problem.

The use of this tentative classification will clarify the literature on roof falls and will serve as a guide to the ultimate solution of roof fall problems.

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Timbering bad roof is expensive

WHEELS of Government

● *As Viewed by A. W. Dickinson of the American Mining Congress*

Washington Highlights

$28,000,000,000: Federal taxes may reach this fantastic figure in 1943.

PERCENTAGE DEPLETION: Mining men resist Treasury attack.

STRATEGIC METALS: Improper taxation of vital defense minerals deplored.

COAL: Need of restoring capital shrinkage explained.

PRIORITIES: Equipment, parts and supplies get higher rating.

GOLD AND SILVER: WPB Mining Branch reinstates many serial numbers of "70-30" mines.

WAGE-HOUR LAW: 40-hour week blasted by opponents.

WAR PROFITS LIMIT: Treasury argues excess profits tax better than fixed ceiling.

MANPOWER: General Hershey warns no blanket deferments.

LABOR CONTROL: New agency proposed to act as czar.

A DELUGE of protests from back home have brought repeated hot debate on the floors of Congress and in Committee rooms over the nation-wide pressure to remove overtime restrictions and to stamp out interruptions of war production. Tired and bedeviled House and Senate leaders for the Administration have brought a lull in the controversy by resorting to recesses which will permit the members of the lower house with the exception of the few engaged in important Committee work, to go home for two weeks to explore the sentiment in their congressional districts preparatory to voting on labor legislation.

There will be no rest for the members of the Committee on Ways and Means who must remain in Washington and carry on with the arduous hearings preliminary to writing the 1942 Revenue Bill, which the President and the Secretary of the Treasury have indicated must be designed to bring in $9,610,000,000 in additional revenue—thereby bringing the "take" for the next taxable year up to a possible high of $28,000,000,000.

Mine Depletion Attack

Appearing on March 3 before a packed committee room Treasury Secretary Morgenthau and his advisor Randolph Paul outlined to Ways and Means Committee members the plan to secure from increased taxes on individuals $3,200,000,000, from corporations $3,060,000,000, from estate and gift taxes $330,000,000, from additional excise levies $1,340,000,000, and from "special privilege" eliminations $680,000,000. Opposing sales taxes and general withholding taxes, the Treasury proposed to leave unchanged the normal corporation rate of 24 percent; to replace the present surtax rate of 6 to 7 percent by a new rate of 16 and 31 percent; to up the excise profits tax range of 35 to 60 percent to a new high of 50 to 75 percent; and to repeal the present declared value excess profits and capital stock taxes. At the same time no suggestion was made to disturb the present invested capital and average earnings bases for excess profits tax, and it was proposed to restore consolidated returns—removed by the Borah amendment on the floor of the Senate in 1934.

Secretary Morgenthau then inveighed against percentage depletion allowances to mineral producers as a form of special privilege the removal of which he said would yield $80,000,000 a year.

The result of the Treasury attack on the mining industry's depletion deduction brought immediate action, and a request was placed before the Committee on Ways and Means asking full time on March 23 and 24 for the wasting natural resource industries to reply and present their position.

Mining Industry Defends Depletion

On March 24 in a series of appearances organized by the American Mining Congress, eight representatives from the industry voiced vigorous and telling opposition to the Treasury's attack. Led by Donald A. Callahan, vice president of the Mining Congress from Wallace, Idaho, himself a producer of lead and zinc, the witnesses plainly told the members of the Committee that the allowance of depletion upon a percentage basis does not constitute a special privilege or an avoidance or an evasion of tax.

Driving home to the Committee the "all out" demand for production from the mines the testimony gave still further emphasis to the present status of war production need presented by the immediately preceding petroleum and gas witnesses.

In explaining the part which mining is taking in the present national emergency Mr. Callahan stated that the mining industry has pledged itself to full cooperation with the government program and is bending every effort to increase production. He explained that mineral producers are not asking any special privilege or any less tax than that which industry and the people generally will have to bear—that the industry is not protesting against the rates of taxation and that it is ready to go ahead and

increase its production although it is taking out its ore and using up its capital at greatly accelerated rates to meet the nation's need. The industry is going to exhaust its mineral resources at a higher rate than ever before and will pay upon the profit that may be realized, not only the highest normal tax but the highest excess profits tax that ever was levied.

Mr. Callahan recalled that when percentage depletion was written into the law in 1932 he had appeared and urged the Congress to adopt this method as a simple and economical procedure for determining the depletion deduction, thus avoiding the complexities and heavy expenditures which acted to deny depletion to many hundreds of taxpayers. He submitted to the Committee that for the years 1928 to 1939 inclusive the nation's metal mines on gross earnings of $8,204,032,000 took depletion of $655,374,000 or materially less than the statutory 15 percent allowed to metal mines.

He pointed out that most mines, and the industry as a whole, failed to recover the value of their capital in those years in which a profit was made, due to the effect of the 15 percent of gross and 50 percent of net income limitations.

In closing he earnestly requested that the mining industry be not asked in times like this to revert to practices that were discarded because of their high cost, inefficiency, and discrimination and that it be permitted to devote its full energies to production rather than to wrangling with the Treasury over valuations. He stated emphatically that never were the funds returned through depletion being used to better advantage than they are today in the exploration and development of mineral resources for winning the war.

Speaking for the small mine operators of his state and throughout the West, Charles F. Willis of Arizona, emphasized the point that the large producing mines are found and developed by small operators and that these men particularly needed a simple way of determining depletion allowances. From the California Chapter of the American Mining Congress, Robert M. Searls testified to the short-lived nature of strategic mineral deposits and the absolute necessity for a more rapid recovery of their capital value. His testimony drew the comment from Committee member Wesley Disney of Oklahoma that the government has taken an anomalous attitude wherein the RFC is lending money to promote the production of these metals and the OPA has raised the price; yet the Treasury is discouraging development, through endeavoring to eliminate the means whereby the capital invested may be recovered. Evan Just from Oklahoma told the Committee that the miners of the Tri-State District have not been able to realize more than one-half of the 15 percent depletion rate as a replacement of their capital and that the incentives to prospect for additional ores are already inadequate to sustain an important lead and zinc mining industry.

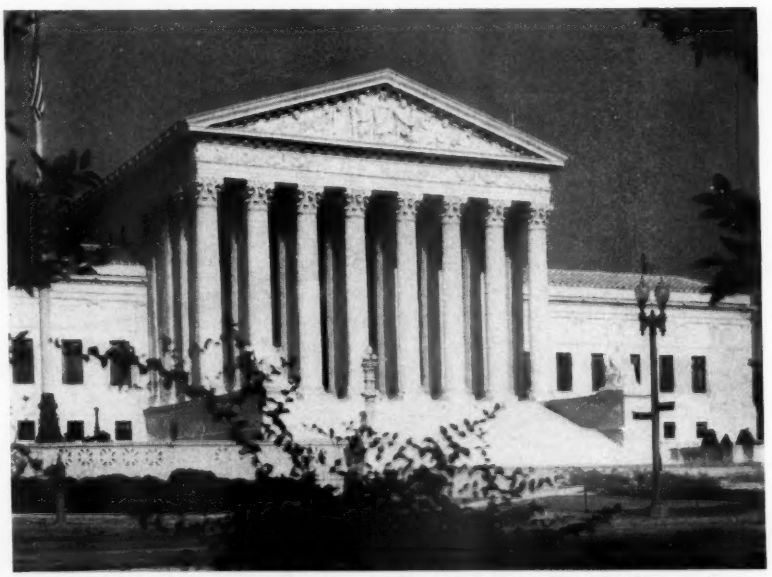
Rolla D. Campbell of West Virginia, George A. Merchant of Illinois, and J. G. Puterbaugh of Oklahoma, explained the absolute necessity for the percentage depletion deduction in coal mining operations, demonstrating the industry's tragic financial history for the Committee and showing from the Treasury's statistics of income that there is a definite shrinkage of its capital. In response to questioning by the Committee Mr. Campbell stated "in my judgment the percentage of gross for coal should not be less than 10 percent"; he made the further statement that the percentage depletion method is absolutely essential to the smaller companies because they are wholly unprepared to establish a valuation of their coal reserves by any other means.

On April 13 Chairman Fernald of the AMC Tax Committee, is to make a further presentation covering relief provisions under the present excess profits tax law and other essential changes in the revenue structure which will be of telling importance in bringing our metals, non-metallic and coal production to the vast volume necessary for the winning of the war.

P-56 Rating Advanced

As the result of further efforts to secure the necessary equipment, parts and supplies to keep the mines of the country in full operation, Dr. Wilbur A. Nelson's Mining Branch of the WPB on March 2 succeeded in securing additional amendments to Preference Rating Orders P-56 and P-56-a. Under the amended order the mines now have an A-1-c rating applicable to assigned quotas of repair parts, and an extendable A-1-a for breakdowns. Upon approving a request for new machinery and equipment the WPB may use any rating necessary to insure delivery; such ratings to be granted where the equipment is to be used primarily to maintain or increase production and not primarily to reduce cost.

Unfortunate was the decision of high War Production Board officials to curtail priorities assistance for mines in which the combined gold and silver content accounts for more than 30 percent of the dollar value of the production. Under the order as issued this limitation tended to deprive hundreds of mines producing copper, lead, and zinc, and siliceous



Important decisions are handed down in the United States Court Building on the course of American life

fluxing ores from obtaining equipment and parts for maintaining operation. Subsequent action and assurances from the WPB and its Mining Branch have done much to correct this error, and at this writing approximately a hundred gold and silver mines have had their serial numbers under P-56 reinstated.

Under P-56-a the WPB may again use whatever ratings are necessary to obtain delivery of raw materials, and the A. M. C. committee of manufacturers is actively at work to secure consideration of the industry's needs.

Under the quota requirements covering the procurement of repair parts for mining operations, the Mining Branch has recently given notice that all mines operating under serial numbers may continue to apply the A-1-c rating to repair part purchases for April delivery, provided that the total dollar value does not exceed the quota previously computed for March. The Branch also urges that the information which is needed to compute second quarter quotas be furnished immediately. The following letter addressed by Dr. Wilbur Nelson to mines operating under P-56 is important:

> "Any operator who has not yet submitted to the Mining Branch an estimate of his repair part requirements for the second quarter of 1942 and the related figures for 1941, as previously requested, should do so without further delay. This is necessary in order that the Mining Branch may approve and assign the second quarter of repair parts under Schedule A to which an A-1-c preference rating may be applied.
>
> "Pending receipt from the Mining Branch of the official assignment of his second quarter quota, an operator may proceed to endorse an A-1-c rating on purchase order for repair parts or equipment on Schedule A, provided that the aggregate total dollar value so endorsed, for deliveries during the month of April, shall not exceed the March quota figure which the operator computed on his own account in accordance with the provisions of the March 2 revision of the P-56 order."

Pressure for Labor Bill

The battling of the Administration to preserve the Wage-Hour Law has resulted in a temporary deadlock in the House Committee on Naval Affairs over the Smith bill. It is possible that the bill may come out of Committee after April 13 in a form which will provide a 48-hour week without overtime pay in war industries, freeze closed shop status, outlaw jurisdictional labor disputes, eliminate double time for Sundays and holidays, and establish a 6 percent limitation on war contracts profits.

The 6 percent limitation was vigorously opposed before the Naval Affairs Committee by Randolph Paul of the Treasury. He said that similar provisions of the Vinson-Tramell Act were removed in 1940 because of crushing bookkeeping and administrative burdens on contractors and the government alike, and further because such an arrangement leaves no incentive for reducing cost to the government of the projects undertaken. The Treasury believes that excess profits taxes are a better method of recapturing unduly high profits if and when they exist.

War Demands on Industry's Manpower

That the situation of mining, as well as of all civilian enterprise will become more difficult from the manpower angle is a foregone conclusion. The head of the Selective Service, General Hershey, is telling the public that our country is to have a very large army and that men for the fighting forces will be taken without regard to dependents. Plans now made do, however, contemplate deferments for employes who are necessary to war production. There may also be a reallocation from the ranks of the men 45 to 65 years old after their registration April 27. The only recourse for a mining operation interested in retaining the services of employes of particular skill is to place full facts before the local draft board, as cases will be decided on individual conditions. There will be no blanket deferments.

Ushering in the most drastic governmental control over labor that this country has ever experienced has come the reported decision of the President to appoint under the WPB, a National Manpower Board. The creation of this agency has been on the fire for several weeks, with delay occasioned by a struggle in which the Department of Labor and the Federal Security Administration have been pressing to have it placed under their respective jurisdictions. Reported efforts of the A.F.L. and C.I.O. to place the Board in the Department of Labor were partially successful in that the plan calls for war industries to hire their workers through the United States Employment Service. It is understood that the Manpower Board will, however, direct policies governing the use of the labor, will control the training of workers and the application of labor priorities to industries or plants which are short-handed. Allocation of labor between employers and general questions of industrial deferments from military service will also come under review by the board. Other duties of this powerful board include curtailment of production in non-essential industries, housing problems, determination of vacations, staggering of shifts, and the movement of workers and their families from one location to another.

Mining Congress Committee on Underground Power Meets at Mt. Hope, West Virginia

A meeting of the Power Committee was held at the Mountainair Hotel, Mt. Hope, W. Va., on March 13, 1942, under the chairmanship of C. C. Ballard, New River Company. A total of 23 men attended, including operators and manufacturers from several states, representatives of the U. S. Bureau of Mines and the West Virginia Department of Mines.

This committee has recently completed reports on Characteristics of D-C Circuits, showing resistances, carrying capacities and voltage drops of various sizes of feeders and returns, that are commonly used in mining. These curves and tables were calculated especially for underground service and after publication in the MINING CONGRESS JOURNAL were reprinted for wide circulation to the industry.

The meeting on March 13 was called to consider a study on Wiring Systems for Conveyor Mining which is being conducted by a subcommittee under the chairmanship of W. F. Roberts. A preliminary report was submitted, and a general discussion followed on the main features of a power line installation, such as, sectional and continuous cables; connection boxes; junction boxes; distribution boxes; grounds; control switches; with reference to safety and permissibility as well as operating requirements.

Following this discussion, the subcommittee went into a special session to consider the points which had been raised and in the near future a preliminary report will be presented to the main committee for their further revision or adoption.

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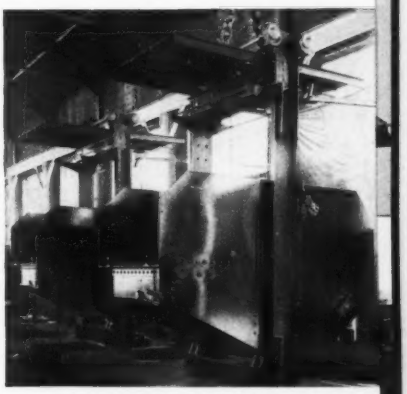

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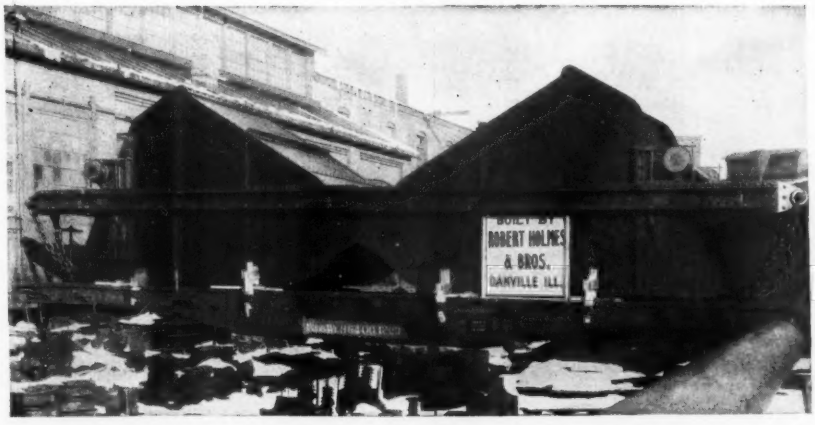

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Weight per ft. of Section	5 lb.
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For complete information on the new No. 5 Tie, write to Bethlehem Steel Company, Bethlehem, Pa., for Booklet 475A.

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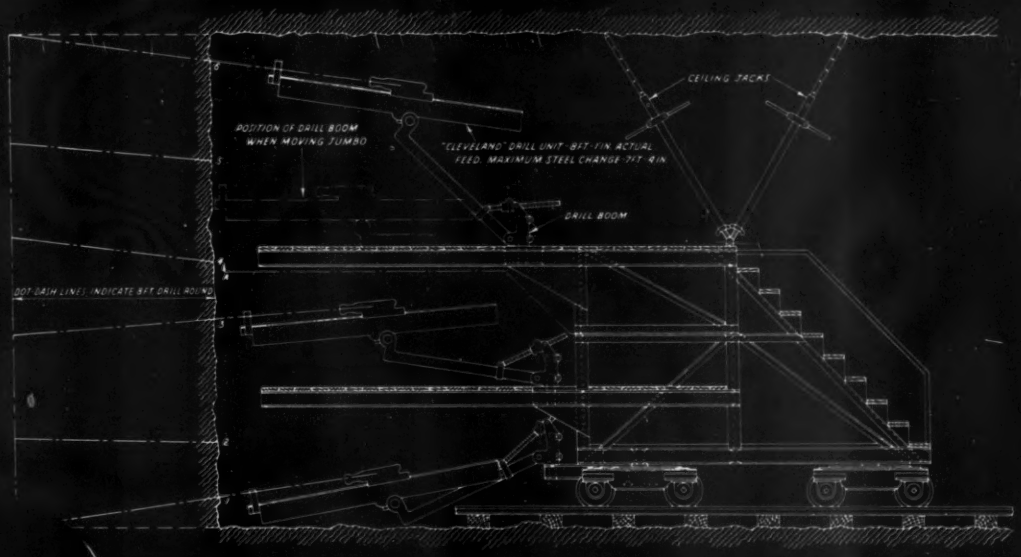
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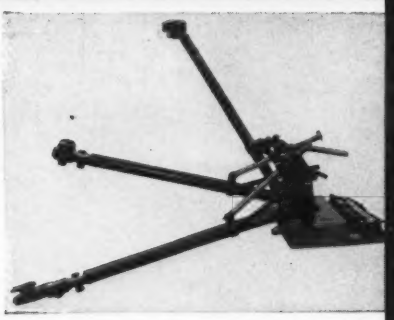
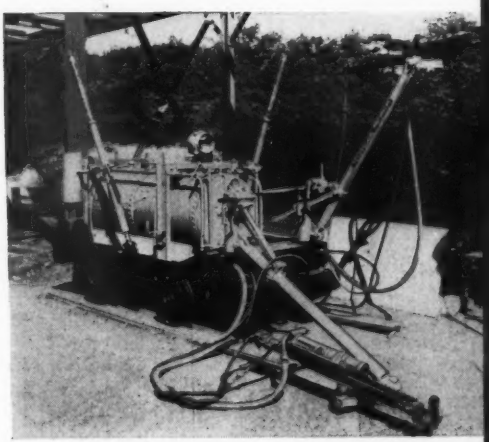


PICTURED at the right is the double-boom type, mounted on a car provided by the purchaser, together with large water tank and two small air receivers, also built into the complete unit by the mine. This rig is safely and quickly set up. It makes the holes easy to spot, and easy to drill, to exact angles and positions. Better drilled holes give you more breakage for your round.

The blueprint shows three of the single-boom units mounted for working a 25′ x 20′ tunnel. Prints showing the plan view of this operation, with layout of the round, sent to interested mine officials. Single-boom unit weighs 1030 pounds for the 6-foot length of boom. Width of base varies depending upon track gage. May we supply Bulletin and complete specifications?



Note the worm and jack-screw mechanism for quickly changing the height position of the drill. Drill supporting booms swing from side to side and are readily locked rigidly in position. The base contains air and water manifolds, line oilers, valves, etc., the design facilitating quick set-up or moving. Top picture shows the 3-Boom Rig.

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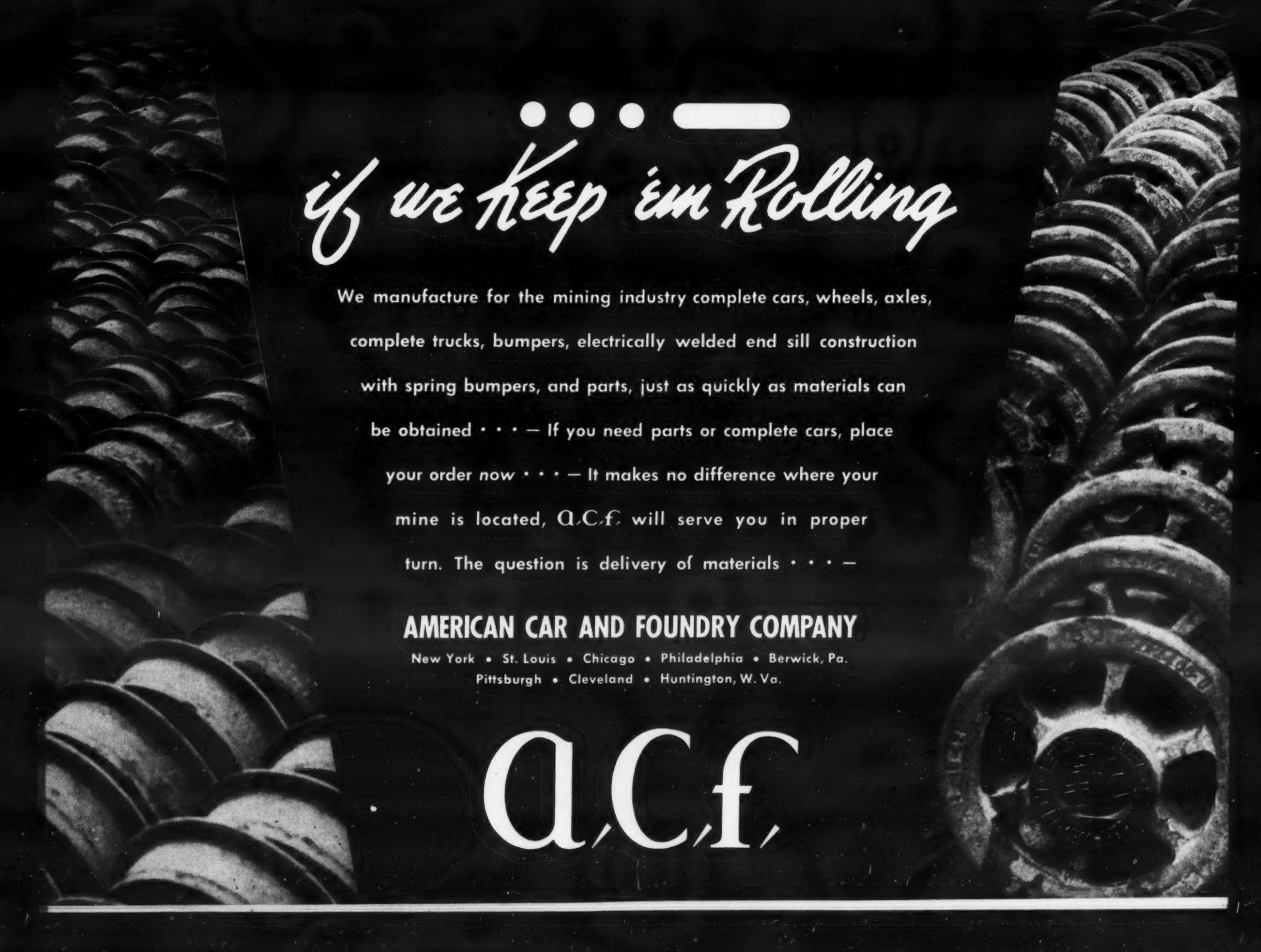
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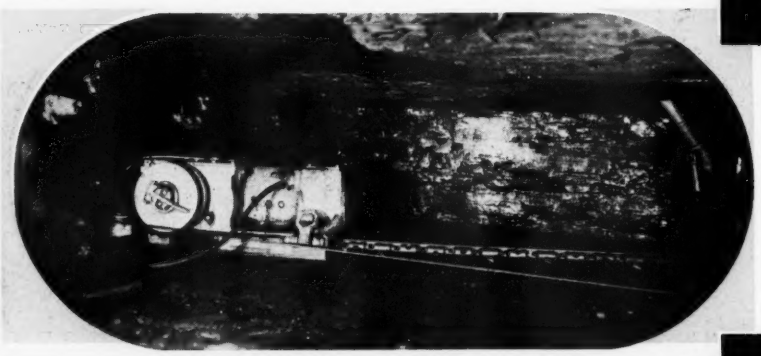

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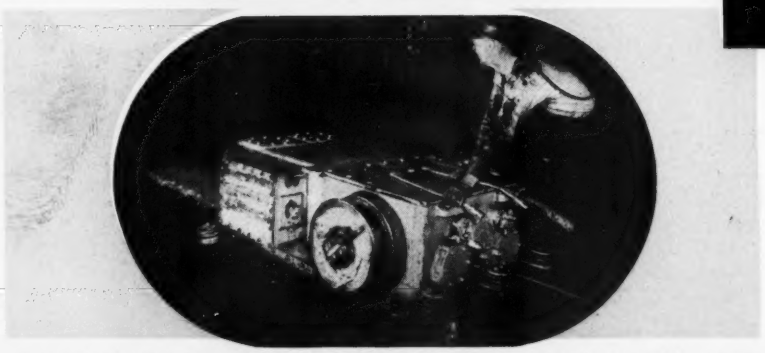
Take-up is smooth and gradual with Sullivan lever-controlled rope drums. Only a moderate pull on lever is required to firmly engage the clutch. Drop the lever and it moves back to neutral.

CUTTING

Locking pin arrangement to hold lever in position can be used, if desired, while cutting. One pull on the lever allows the pin to drop out of the way.



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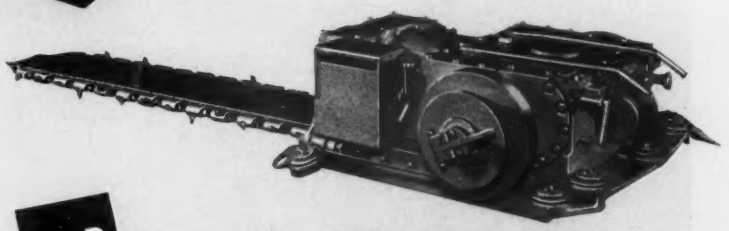
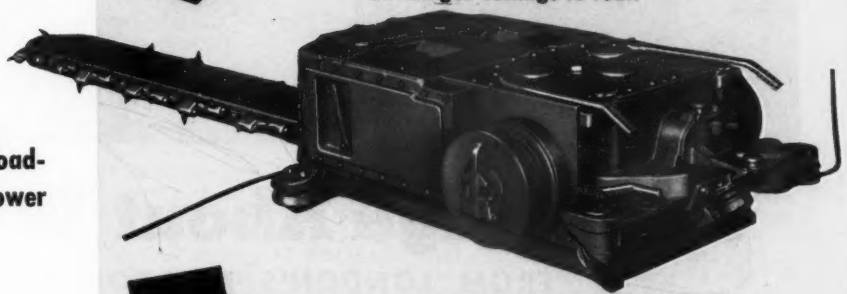
5B-1

5B-1—10 H.P.—Light duty Shortwall and lowest machine on the market that delivers cuttings to rear.



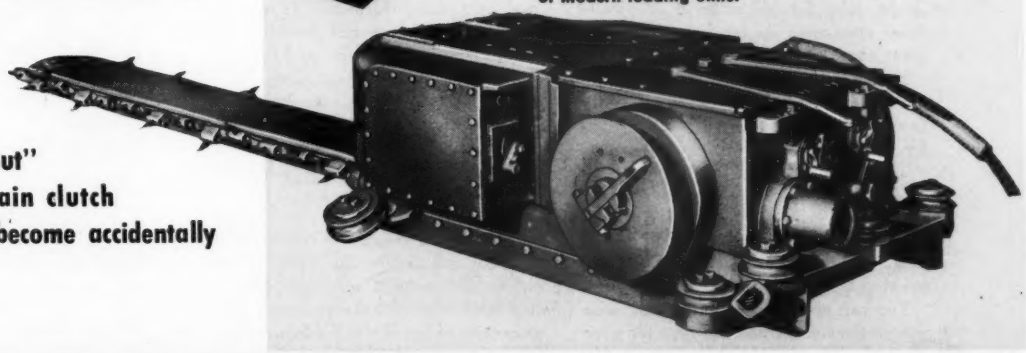
11-B

11-B—20, 35 or 50 H.P.—The lowest cutter in its power range which discharges cuttings to rear.



7-B

7-B — 50 H.P. — Particularly adaptable to modern mechanized mining, due to the fact that its cutting capacity is greater than that of modern loading units.



WRITE TODAY FOR COMPLETE INFORMATION ON SULLIVAN'S LINE OF MODERN COAL CUTTERS

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Wickwire Rope helps London keep enemy aircraft above the Balloon Barrage—one of scores of Victory services performed by Wissco products.

A Message About Wire Rope

FROM LONDON'S BALLOON BARRAGE!

Here is a vital message written in steel upon the skies over London . . . where a single order for 587 miles of Wickwire Rope now adds its bit in protecting a great city from dive bombers.

Every foot of that wire rope is an eloquent argument in itself, speaking directly to every user of wire rope—whether used for war, or for essential civilian services.

The message is: VICTORY NEEDS *STEEL!* Victory needs night and day all-out efficiency in every industrial operation. Wire rope that fails too soon wastes steel. The time wasted replacing it is a red stop light on Victory.

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The long life of Wickwire Rope begins with skillful production of the metal in our own blast furnaces. It continues through proud care and precision methods in drawing the wire, and laying the rope. Wickwire representatives give expert help in advising on the best type of rope for each use. And after delivery, Wickwire Service in the field continues to work with you, to assure longest life on the job.

• • •

Our authoritative "KNOW YOUR ROPES" manual, on the selection, application and usage of wire rope, has profited more than 25,000 rope users. Ask for your copy today. Write Wickwire Spencer Steel Company, 500 Fifth Avenue, New York, N. Y.

A FOOT OFF may make your rope last longer. Constant bending and unbending around a sheave will finally wear out any rope. A foot off the rope redistributes the wear. This and forty more rope life-savers are pictured and described in our booklet, "Know Your Ropes."

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WISSCO PRODUCTS

PERSONALS

Former **Senator Edward R. Burke** of Nebraska, and **L. E. Tierney** of Bluefield, W. Va., are the recently announced officers of the newly formed Southern Coal Producers Association. Senator Burke is taking over the office of president and Mr. L. E. Tierney, treasurer. Other officers of the Association have not yet been announced.

Charles L. Bradbury, vice president and general manager of the Raskob Mining Interests, Inc., of New Mexico, has been elected president of the New Mexico Miners and Prospectors Association. Other officers elected were: First vice president, **F. O. Davis**, Carlsbad; second vice president, **J. B. Carman**, Questa; treasurer, **R. M. Twiss**, Vanadium; secretary, **Albert P. Mracek**, Central; directors, **T. D. Benjovsky**, Silver City; **T. M. Cramer**, Carlsbad; **C. S. Elayer**, Vanadium; **Vernon Taylor**, Grants; **V. F. Foy**, Albuquerque; **Horace Moses**, Hurley; **E. C. Iden**, Albuquerque; **R. P. Raskob**, Albuquerque; **A. S. Walter**, Socorro; **Lem C. White**, Raton; **J. F. Woodbury**, Silver City; **Ira L. Wright**, Silver City. Executive committee, **T. D. Benjovsky**, chairman, Silver City; **T. M. Cramer**, Carlsbad; **J. F. Woodbury**, Silver City.

A. W. Thorson, of Detroit, assistant fuel service engineer for the Chesapeake and Ohio Railway Company for the last two years, has been appointed assistant to the president of Carnegie Institute of Technology. He will assist President **Robert E. Doherty** in securing financial support for the Coal Research Laboratory, and will also aid **Dr. H. H. Lowry**, director of the laboratory, with its general business operations.

P. R. Bradley, Jr., general manager of Alaska Juneau Gold Mining Company and Bradley mining interests in California, was recently elected president of the Mother Lode Mining Association at Sonora, Tuolumne County, Calif.

Wm. Rachunis was recently named associate federal coal mine inspector by the U. S. Bureau of Mines and assigned to the Mt. Hope, W. Va., district. Following seven years in the anthracite mines, Mr. Rachunis was assistant foreman for the Susquehanna Collieries at Glen Lyon. Mr. Rachunis has had wide experience in the coal mining industry and has always been interested in mine safety. His office will be at Montgomery, W. Va.

George E. Tucker has been appointed superintendent of the Canisteo Iron Mine at Coleraine, Minn., for the Cleveland-Cliffs Iron Company.

William Kindrick has been made assistant superintendent of the Trout Lake concentrator of the Oliver Iron Mining Company, at Coleraine, Minn.

J. E. Tobey, vice president in charge of engineering of Appalachian Coals, Inc., has tendered his resignation effective April 15, to become associated with the Coal Bureau of the Upper Monongahela Valley, Fairmont, W. Va., to handle promotional activities. Mr. Tobey, in charge of engineering for Appalachian Coals, has made an enviable record in his chosen field.

Harold Von Thaden, vice president of Robins Conveying Belt Co., Passaic, N. J., returned early in March from Rio de Janeiro, Brazil, where he had accompanied the United States delegation to the Rio conference.

A. C. Carlton, curator of fuels and metals, has been granted a temporary leave of absence by the Museum of Science and Industry, Chicago, to assist the War Department in the production of ammunition, according to an announcement today by **Major Lenox R. Lohr**, its president. His curatorial place during the emergency will be assumed by **L. C. Fopeano**, associate curator of engineering construction, who has been on the museum staff for nine years.

John Huttl, assistant editor of *Engineering and Mining Journal* returned to New York in February from Santiago, Chile, where he attended the Pan American Congress of Mining Engineering and Geology. Mr. Huttl also visited leading mining districts in six other South American countries.

John A. Robinson, president of the Tri-State Zinc & Lead Ore Producers Association, Picher, Okla., announces the appointment of **James K. Richardson** as secretary of the association, effective April 1. Mr. Richardson has been safety director since 1936, for the Climax Molydenum Co., Colorado, where he was in charge of accident prevention, industrial hygiene and public relations. Following graduation from the Missouri School of Mines and Metallurgy he was employed by the U. S. Potash Co. of Carlsbad, N. Mex., on various positions, and finally as engineer in charge of research. Later he headed accident prevention work for the company and developed a successful safety and public relations program. He will reside with his family in Miami, Okla. Mr. Richardson takes the place of **Evan Just**, who has served as secretary of the association for the past five years. Mr. Just is leaving to join the editorial staff of *Engineering & Mining Journal*, New York, N. Y., but will remain to assist Mr. Richardson during April.

James K. Richardson

— *Obituaries* —

William S. Eichelberger, Philadelphia district sales manager for the Consolidation Coal Company, died at Merion, Pa., on March 13. Mr. Eichelberger was 44 years old. He joined the company originally as a salesman in July, 1925, and at various times was engaged in sales activities with the company's Cleveland, Philadelphia and Baltimore offices. In July, 1937, he left to join the Bituminous Coal Division at Washington as technical advisor to the Office of Consumers' Counsel. He rejoined the Consolidation Coal Company in 1941.

W. L. Haehnlen, president of the Tonopah Mining Company and of the Tonopah and Gold Fields Railroad, died in Philadelphia early in March.

E. J. Christy, chief engineer and purchasing agent for the Wheeling Township Coal Mining Co., Adena, Ohio, died on February 26. Mr. Christy started coal mining at the age of 17 with the John L. Jones Coal Company of Burgettstown, Pa. He had been employed by the Wheeling Township Coal Mining Co. as superintendent since 1918.

NEWS and VIEWS

Gold Miners Present Their Position Concerning Priorities

The following resolution was passed by approximately 200 gold mine operators who met at Sacramento on Friday, March 27. It embodies the determination of the gold miners that they shall, through conservation of materials to the *n*th degree, cooperate with the government's war effort. Likewise, they feel the vital importance of carrying on their operations in order to prevent any serious dislocation of economic stability or unnecessary unemployment during these trying times.

The operators pointed out that it is now up to those who engage in gold mining to follow the spirit and letter of the resolution, and they must conserve, repair, help each other in such matters as the pooling of materials and equipment until the government is fully aware that when a gold miner sends in a priority request, he has done so only after exhausting all the ingenuity at his command. They also stated it is the only practical way to live under present conditions and it is the only patriotic way.

The resolution follows:

WHEREAS it has been brought to the attention of the responsible operators of the California gold mining industry, through the issuance of War Priority Order P-100, that the priorities heretofore accorded the industry under order No. P-56 have been revoked and that the purchase of all allocated materials which are essential to the operation and maintenance of our mines can be made only on A-10 priorities or by special application under form PD-1-A; and

WHEREAS the rapidly accruing shortage of these materials indicates that it shortly will be impossible to acquire any of them under an A-10 priority, and inability to acquire minimum requirements of such materials will inevitably result in the closing down of all gold mines and dredging operations in California; and

WHEREAS it is the unanimous opinion of the industry representatives gathered here that such a closing of the gold mines would be an unnecessary and irreparable injury to this state and nation for the following, among other reasons:

(1) Many of the mines are very deep and must be operated in order to prevent caving and filling of workings with water, rendering it virtually impossible to ever work them again.

(2) These mines constitute the sole or major domestic economy in 19 out of the 58 counties in this state, supplying the payrolls, paying the taxes and buying materials which enable these communities to exist. Their destruction will cause untold private economic injury and will be destructive to local public credit.

(3) The gold produced from these mines is an important contribution to public wealth and furnishes the basis for large increments of state and federal taxes.

(4) Destruction of these mines by priority deprivation and the resulting loss and unemployment will be a severe blow to public morale at a time when the national government is seeking to foster courage and industry on the part of the public and will tend to destroy public confidence in gold as an essential element of our monetary system; and

WHEREAS the operators here present and the communities from which they come are more than anxious to support the national war effort in every respect and at any sacrifice necessary therefor, but believe that the minimum amounts of strategic materials necessary to keep their mines open and running, without extension of existing operations, is so small that with the conservation measures hereinafter resolved upon, the same could be allocated to the industry without noticeable effect on the country's war needs: Now, therefore, be it

Resolved: First, we are unalterably opposed to the destruction of the gold mines of California due to entire withdrawal of priorities necessary to give them minimum supplies of strategic materials which are required for present operations and to any government policy which would enforce such priority withdrawals;

Second, we pledge ourselves to form community units, pooling supplies of salvagable materials, repairing every possible item of equipment, cooperating in the use of machines and endeavoring in every way to work with the local representative of the War Priority Administrator;

Third, we request the associations and operators here present to cooperate in the compilation of facts showing the soundness of the position we have here taken and the justification for definite allocations of priority materials to our mines and dredges so as to make continuation of existing operations possible and to insure preservation of these mines; and further through appropriate representatives to be selected by the associations present at this meeting, to present these facts and the merits of our proposal without delay to proper federal officials for action thereon;

Fourth, we recommend that the cost of presenting such a case to the government be imposed upon the entire gold mining industry through appropriate action to that end to be taken by said several associations present after conference between their respective executives.

At a meeting in Butte, Mont., on March 16, these men from Idaho and Montana gathered to discuss development of strategic metals, Priorities Order P-56 and other mining problems of wartime importance.

Front row, left to right: Elmer Pehrson, United States Bureau of Mines, Washington, D. C.; R. D. Leisk, Manager, Sunshine Mining Co., Kellogg, Idaho; Governor Sam C. Ford, Helena; Oscar Chapman, Assistant Secretary of the Interior; Dr. Francis A. Thomson, President, Montana School of Mines; R. S. Dean, U. S. Bureau of Mines, Salt Lake City, Utah.

Back row, left to right: Dr. D. F. Hewitt, U. S. Geological Survey, Washington, D. C.; Dean A. W. Fahrenwald, School of Mines, University of Idaho; Carl J. Trauerman, Secretary-Manager, Mining Association of Montana, Butte, and J. J. Carrigan, Mine Manager for the Anaconda Copper Mining Co., Butte.

Meeting of American Zinc Institute

The Twenty-Fourth Annual Meeting of the American Zinc Institute will be held on Monday and Tuesday, April 20 and 21, at the Chase Hotel in St. Louis, Mo. Washington agencies concerned in the war effort have welcomed the opportunity to participate in this meeting, and representatives will be present to discuss and advise on various phases of the industry's part in the victory program.

Zinc Mining Company Plans Greater Output

The American Zinc, Lead & Smelting Company, which is operating two big zinc mines at Metaline Falls, Wash., was recently reported to have completed a deal with Jesse Jones, Federal Loan Administrator, for the production of 17,000 tons of electrolytic zinc and 7,200 tons of retort zinc annually. The smelting company owns the controlling interest in the Metaline Mining & Leasing Company and has a lease on the Granview mine, both of which are in heavy production. Fulfillment of the contract would require more extensive mining and milling operations at Metaline Falls.

More Coal Buying Urged

Secretary of the Interior Harold L. Ickes said recently that although figures reported by Howard A. Gray, Acting Director of Solid Fuels Coordination, indicate some purchasing by dealers and consumers for protective storage purposes, there is no indication that the nation is storing coal in quantity sufficient to give it adequate wartime protection from possible shortages that may be caused later by transportation bottlenecks and other factors. Secretary Ickes warned that the country would endanger its fuel supply if it allowed coal production to drift into the customary seasonal decline this spring.

The United States Bureau of Mines estimated anthracite production to be 1,175,000 tons for the week ending March 14, as compared with 1,179,000 tons for the previous week and 1,096,000 tons for the week of March 15, 1941. Acting Director Gray reported that although there was evidence of some advance season buying for storage purposes, there was no indication as yet that the customary off-season slump in coal movement would be averted this year.

The Secretary said that to follow customary fuel movement practices this year would cause a large part of the mine and carrier capacity to remain idle during the spring and summer, and then require it to attempt to move a tremendous load in the few short months later in the year. He added that in view of the war, the fall peak, unless leveled off by preseason coal stocking, may be relatively heavy this year, and warned that the country's transportation system is expected to be handicapped in meeting it. For one thing, he said, the supply of coal cars is not expected to be as plentiful this year as in the past, since a large quantity of materials and supplies other than coal also may have to be moved in open top cars due to war demands upon transportation equipment.

The Office of Solid Fuels Coordination stated that stockpiling of coal is not hoarding, but that it is utilizing present production and transportation capacity to store coal as protection against shortages that may result from the effect of the war upon coal movements.

Domestic Bauxite Mining

Active mining of domestic bauxite has been commenced by a subsidiary of the Reynolds Metals Company, according to a recent announcement by R. S. Reynolds, president of the company. Bauxite from Arkansas deposits, now being mined by the Reynolds Ore Company, will be shipped to the Alabama aluminum plant of the Reynolds Metal Company. The company formerly received bauxite ore from the Netherlands East Indies, being transported more than eight thousand miles. During the past fall the Reynolds Company made contracts for bauxite from Surinam, in South America. Using bauxite from domestic sources releases ships that otherwise would be required to bring this mineral across the sea, and in some degree also cuts down the rail haul required to bring the ore to the plant.

Superior Design Provides These "Extras" —For Faster, Lower-Cost Loading!

In many a mine today, Gardner-Denver Mine Car Loaders are making a tough job easy . . . cutting ore production costs substantially. For these loaders have EXTRA mucking ability— an extra measure of low cost operation. These "*extras*" *are the result of definitely superior loader design . . . such advantages as two equally powerful 5-cylinder radial air motors, and the Gardner-Denver rocker principle which concentrates the mucking force exactly where you need it—increases lift and accelerates discharge of the dipper. For full information on these fast, cost-saving Mine Car Loaders, write Gardner-Denver Company, Quincy, Illinois.*

HOW THE GARDNER-DENVER ROCKER PRINCIPLE WORKS

1. At the start of cycle force is applied to top of rocker for greater "crowding action" in filling dipper. Small effective diameter of the nearly empty winding reel aids power.

2. As dipper is filled and raised clear of the muck pile, application of force changes to midpoint of rocker. This, and the greater effective diameter of the full winding reel, increases speed of dipper as it nears discharge position.

GARDNER-DENVER PRODUCTS SPEED VICTORY

REPORT FROM A MONTANA PHOSPHATE MINE: "Operating in bad ground, our GD-9 Mine Car Loader enables us to advance our drift as far in two days as we formerly progressed by hand mucking in ten days."

GARDNER-DENVER *Since 1859*

"Tentative Coal Mine Inspection Standards" Announced By Bureau of Mines

A list of more than 600 standards which are being recommended to the coal mining industry for safeguarding the health and lives of miners and improving operating efficiency has been compiled by the Bureau of Mines as part of its program of improving health and safety in and around coal mines, Dr. R. R. Sayers, Director of the Bureau, recently informed Secretary of the Interior Harold L. Ickes.

Drawing from more than three decades of research in the coal fields and in the laboratory, Bureau experts designed the list for use of Federal coal mine inspectors, mine operators and miners.

Operating under the Federal Coal Mine Inspection Act of 1941, the Federal inspectors have gone into the field to investigate conditions in coal mines and to offer recommendations for eliminating hazardous practices and conditions so that man power and material will be conserved for the Nation's war efforts and for the peacetime production program to follow.

Dr. Sayers informed Secretary Ickes that there is a wide variation in health and safety regulations in the States and that the Bureau's standards are far more comprehensive than any State laws. The standards enumerated by the Bureau, which have been published in pamphlet form, are subject to modification to keep apace with changes in mining methods. Copies of the publication may be obtained by writing to the Bureau of Mines, Department of the Interior, Washington, D. C., for Information Circular 7204, "Tentative Coal Mine Inspection Standards."

"Completion of the pamphlet marks the first time that so many proven health and safety recommendations dealing with coal mines have appeared in one publication," Dr. Sayers added. "The publication explains in a clear-cut manner the methods advocated by the Bureau—methods which have been adopted in many mines and which are paying dividends in lives saved and in more economical production of coal."

The publication was prepared by a committee of several of the most experienced safety engineers of the Health and Safety Branch of the Bureau which is headed by Dan Harrington. The Coal Mine Inspection Division, a unit of this branch, will incorporate the data in the field book used by the coal mine inspectors. As the inspectors tour a mine, they will compare the Bureau standards with practices and conditions prevailing in the operations they are inspecting.

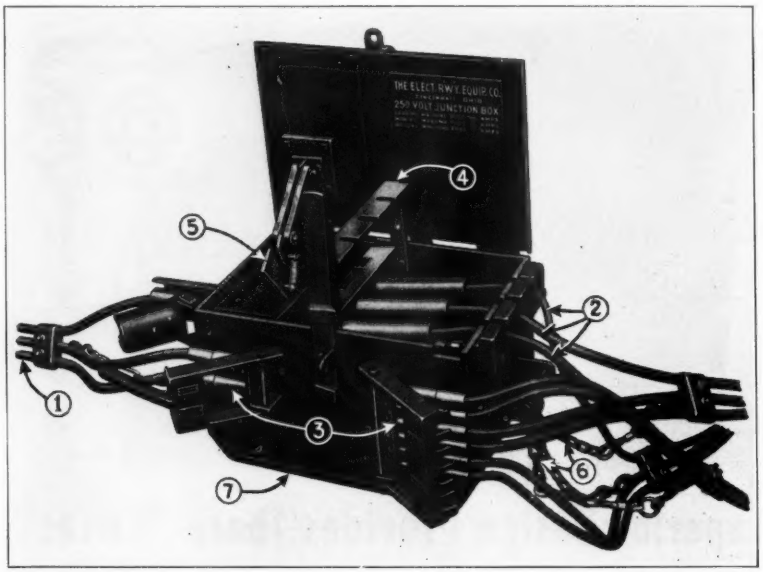
When used by operators and miners, the circular can be consulted for determining which methods of operation are approved by the Bureau and which are considered hazardous. It describes approved practices and conditions for surface and underground operations.

The surface hazards are grouped under the following topics: General surface conditions, surface plant and equipment (tipple or cleaning plant), headframe (if a shaft mine), machinery (surface and underground), mine refuse disposal, surface haulage, hoisting equipment, cages, steam plant, surface electrical equipment, surface explosives (storage and transportation).

Underground operations are covered under these topics: General practice, ventilation, explosives, electricity underground, control of dust and rock dusting, haulage, timbering, safety organization, first aid and mine rescue.

Mine Inspectors to Meet

Mine inspectors the country over will gather May 25-27 of this year at the Lafayette Hotel, Lexington, Ky., to discuss the problems of their profession. Included will be Federal and State headquarters officials, State mine inspectors, county inspectors, mine operating officials and company inspectors, insurance headquarters officials, insurance inspectors and other classifications of persons interested in safety and determined to find some way to help the war by a reduction in the accident rate.



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The ELRECO No. 1228 JUNCTION BOX for D.C. circuits is the essential safety link between the power source and the coal mining equipment.

7 Features Guarantee Safe and Efficient Service

No. 1. 3-Wire incoming power circuit cables (Pos., Neg. & Safety Ground). Safety chain and clamp relieves all strain on cable terminals.

No. 2. Out-going positive cables for machine, loader and drill circuits, equipped with removable socket connectors having insulated handles.

No. 3. Pin and socket type connectors for all negative and safety ground cables; mounted on the outside of box to secure complete separation from positive circuits.

No. 4. Safety lever which must be lowered before main switch can be closed. This lever automatically locks all terminal connections in position and prevents any circuit being opened under load.

No. 5. Quick Break Switch operated by the opening or closing of hinged junction box lid.

No. 6. Detachable strain chains and clamps for each individual circuit and which prevents any strain on cable connector terminals.

No. 7. Bottom skids to facilitate moving of box to different locations.

Standard equipment includes 200, 100 and 35 ampere 250-volt enclosed fuses —solder type terminal connections eliminate necessity of all vulcanizing or splicing of cables, and 28" height of box permits use in low coal seams.

The Electric Railway Equipment Co.

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1941 Iron Ore Shipments

The 1941 mine shipments of Lake Superior iron ore, according to the report of the Lake Superior Iron Ore Association, Cleveland, Ohio, follow:

Range	Total
Mesaba	59,772,543
Vermilion	1,847,094
Cuyuna	2,441,042
Fillmore County, Minn.	47
Total Minnesota	64,060,726
Gogebic	6,301,379
Marquette	6,254,391
Menominee	4,131,363
Total Michigan-Wisconsin	16,687,133
Total (U. S. ranges)	80,747,859
Michipicoten (Canada)	462,747
Grand Total	81,210,606

(a) Includes 1,722 tons lost in transit.

Beneficiated Lake Superior Ore—Year 1941

Product	United States (Minnesota)
Washed	11,726,096
Jigged	1,708,560
Hi-Density	538,228*
Sintered	289,322
Dried	451,140
Total beneficiated	14,713,346

* Includes hi-density tailings shipped as siliceous ore.

Formerly there was contained in this summary of beneficiated ore also "crushed and/or screened" ore, which included:

(1) The entire tonnage of ore after screening for the purpose of discarding coarse rock as waste, and

(2) The entire tonnage of ore screened for separation of large lumps which were then crushed and recombined with the finer product for shipment.

Because of the growing practice of coarse-screening most or all open-pit ore and crushing the large lumps merely as routine to the mining operation, and also because of the wide differences in opinion as to what portion of such tonnage (i. e., the portion crushed, or the total) should be considered as actually beneficiated, it has been decided to omit henceforth "crushed and/or screened" ore from this summary.

Shipping on Great Lakes has Unusual Early Start

On March 21, a fleet loaded with the first cargoes of coal to be freighted to the upper Lake region left Toledo. It was believed to have been the first time in history that coal and ore carriers had started their shipping season on Lake Erie bound for Lake Superior before April 1.

The extraordinary pre-season shipping, planned by the Ore and Coal Exchange in cooperation with the Government, for the purpose of getting an early start on the movement of coal and iron ore, which are in unusually heavy demand on account of the war, actually was begun on March 16, when shippers took advantage of favorable weather.

WAR PRODUCTION BOARD

Materials Division

Mining Branch Personnel

Address—War Production Board, Mining Branch, 6th and Adams Drive, S.W., Tempo. E, Washington, D. C.

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Assistant Administrator

Non-Metallic Mines
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Technical Advisor

James E. Bacon
Assistant
Technical Advisor

Don E. Gotham
Assistant
Technical Advisor

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Technical Advisor

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F. Stuart Miller
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Joe C. Arundal
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Technical Advisor

P-56

Coal Mines
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William M. Wheeler
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Technical Advisor

K. D. Pfoor
Assistant
Technical Advisor

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Mine Priorities
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Technical Advisor

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Dr. Harry W. Little
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H. D. Waterhouse
Assistant Analyst

Robt. J. Brennan
Associate Analyst

Mining Machinery
Lane W. Hildreth
Technical Advisor

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Analyst

Alexander Falconer
Priorities Specialist

Samuel E. Cobb
Analyst

Smelter Priorities
Harry L. Egolf, Jr.
Technical Advisor

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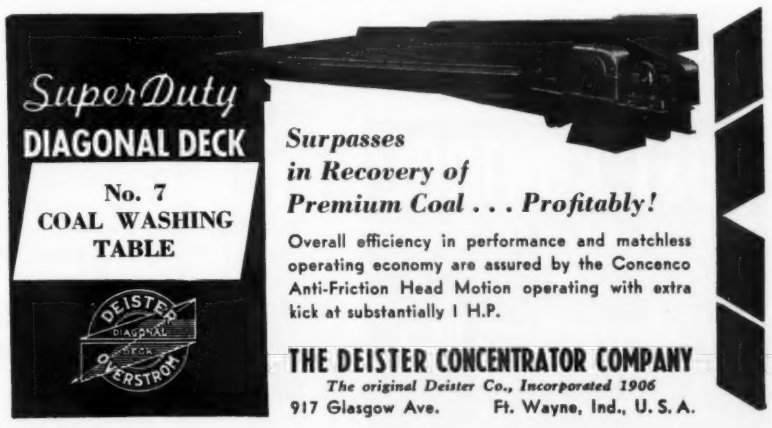
Price Ceilings Will Not Interfere With Exports

In late January, the Office of Price Administration offered to extend to Latin American Republics the same protection as is provided domestic buyers.

At the same time, Director Henderson said every effort would be made to see that price ceilings do not interfere with the normal flow of exports. Particular care will be taken to see that export differentials in the ceilings provide for the higher costs of doing business beyond the borders of Continental United States and, therefore, do not discriminate against the exporter or check the flow to foreign markets.

Metal in Juke Boxes

Shutdown on manufacture of juke boxes or automatic phonographs, noisy fixtures of the American scene, makes these figures interesting: A single one of the larger juke boxes contains enough brass to make 750 cartridge cases. The aluminum in 125 of the bigger juke boxes would make one fighter plane. The steel in one large juke box totals 130 pounds, which would make five light machine guns. Into such a juke box go 42 pounds of plastics which might better be 42 pounds of installation pieces—control panels and so forth—on Army or Navy planes.



Surpasses in Recovery of Premium Coal . . . Profitably!

Overall efficiency in performance and matchless operating economy are assured by the Concenco Anti-Friction Head Motion operating with extra kick at substantially 1 H.P.

THE DEISTER CONCENTRATOR COMPANY
The original Deister Co., Incorporated 1906
917 Glasgow Ave. Ft. Wayne, Ind., U. S. A.

Coeur d'Alene Mine Progresses

The Coeur d'Alene Mines Corporation, Wallace, Idaho, became a dividend payer recently with the declaration of an 8-cent per share dividend, totalling $131,603.

The company is also making an addition to its mill, to bring the total milling capacity to 600 tons per day. A new ball mill is being installed and additional classifiers and flotation cells have already been put in place. Development work in the mines is also being carried on for the purpose of increasing production. It was recently stated that six feet of silver-copper ore was encountered on the 1,600-foot level. This vein had previously been opened up on a level above and it will be sought on the 1,800 and lower levels.

Aluminum Use Restricted

The nation's entire supply of aluminum was marshalled for war on January 27 by War Production Board Chief, Donald M. Nelson, with the issuance of Conservation Order M-1-e.

The order, effective on that date, prohibited the use of aluminum in any manufacture except on war contracts and the items specifically enumerated. The only exception was that aluminum authorized by the Director of Priorities after October 31, 1941, and prior to the effective date of the order could be used for the specific purpose set forth.

Only 15 uses of aluminum were permitted, most of them restricted to low grade aluminum which has not been debased.

Manganese Ore Production

Domestic production of manganese ore containing 35 per cent or more manganese (natural) during January, 1942, was 11,700 long tons, shipments were 11,700 tons, and producers' stocks at the end of the month were 1,400 tons according to the Federal Bureau of Mines. In December, 1941, production was 10,100 long tons. Shipments were 9,700 tons and producers' stocks at the end of the month were 1,400 tons. Shipments in 1941 totaled 76,000 long tons or an average of about 6,300 tons per month. The rate of shipments averaged 3,344 tons monthly in 1940, when the total amounted to 40,123 tons. Arizona, Arkansas, California, Georgia, Montana, Nevada, New Mexico, Virginia, Washington, and West Virginia reported shipments of manganese ore in January.

Research Fellowships in Coal and Non-Metallics

The University of Washington offers four fellowships in the College of Mines for research in coal and non-metallics in cooperation with the United States Bureau of Mines. Fellows begin their duties on Wednesday, July 1, and continue for 12 months. Payments under a fellowship are made at the end of each month and amount to $792 for the year.

The fellowships are open to graduates of universities and technical colleges who are qualified to undertake investigations of research character. Ordinarily the appointees register as graduate students and become candidates for the degree of master of science in mining, or metallurgical, or ceramic engineering; occasionally an appointee registers for the bachelor of science degree in one of these curricula.

The purpose of these fellowships is to undertake the solution of various problems being studied by the United States Bureau of Mines that are of especial importance to the State of Washington, the Pacific Northwest, and Alaska. The investigations consist principally of laboratory work directed largely by the Bureau's technologists. The work is performed in Mines Laboratory, a large modern building fully equipped with the newest forms of machinery and apparatus. For the year 1942-1943 subjects for investigation will be selected from the following fields:

1. Coal: Problems in the treatment and utilization of coal.
2. Non-metallics: Problems in beneficiation of industrial minerals.

As applications will be passed upon in April, each applicant should submit the following material promptly to Milnor Roberts, Dean, College of Mines, University of Washington, Seattle, Wash.: photograph; copy of his collegiate record from the registrar of the college from which he was graduated, or will be graduated in June; statement of his practical and technical experience, if any; statement of his experience or interest in investigations such as will be carried on under the fellowships; letters from three persons, such as instructors and employers, covering specifically the applicant's character, ability, education and experience.

DUST?

COMPOUND "M"
CONTROLS COAL DUST

1. At the face
2. On the haulageway
3. At rotary dumps
4. In the tipple

Wets the dust — not the coal. Increases health — safety — production. Ask the many satisfied users.

Compound M reduces the dust and increases the speed of wet drilling

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The permanent dustless treatment for coal.
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ENGINEERING AND ECONOMIC SURVEYS, ANALYSES AND REPORTS ON POWER APPLICATIONS AND POWER COST PROBLEMS OF THE COAL MINING INDUSTRY
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22 YEARS OF SERVICE TO THE MINING INDUSTRY. Every product guaranteed including our Rebuilt Locomotives, Machines, Motors and Generating Equipment.

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Tuffy

Mining Machine Ropes

For QUICK Installation

without injury to rope!

No special tools are necessary —metal sheath protects rope end—simply push or pull rope into desired position. Tuffies, made of Union-Formed (pre-formed) Wire Rope, contribute to safety for workers—they last longer for less frequent replacements.

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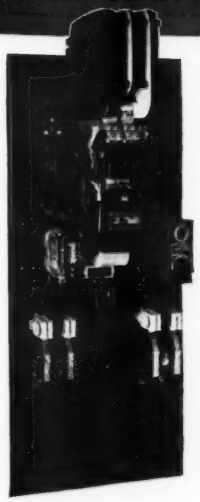
UNION Wire Ropes

T-142 *The* "ULTIMATE LOW COST WIRE ROPE"

PEAK PRODUCTION

with unattended substations



Type KSA Circuit Breakers help produce record tonnages of coal

Efficient substations mean more production by eliminating time losses resulting from disturbances on feeder circuits. This is true of the semi-automatic station which is attended only in starting and stopping and of the full-automatic station which requires nothing but rare, periodic attendance.

I-T-E engineers will gladly cite cases for you, and our factory, busy as it is in these days, has capacity to aid the vital mining industry.

Representatives in Principal Mining Areas

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BRUSHES FOR

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for application to all known makes of mining machinery. A variety of grades are employed each designed to give that ALL IMPORTANT GOOD COMMUTATION.

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THE OHIO CARBON CO.
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Barbara Iron Mine Developed

Butler Brothers, St. Paul, Minn., are developing a new open pit iron mine to be known as the Barbara, at Taconite, Minn., on the Mesabi iron range. The property, formerly known as the Adgate, consists of two forties adjoining the Majorca mine on the west and the Hill-Trumbull mine on the north. A road has been built to the property and stripping has already started. The truck-shovel operation will continue to be developed through the winter and will become a shipper in 1942.

St. Joseph Lead Company Opens Property in Montana

In the annual report of the St. Joseph Lead Company, Clinton Crane, president, pointed out that although at the beginning of 1941 it was felt that the lead production outside the United States would be sufficient to insure against any shortage, the war so greatly increased the demand that, upon request of the government, the company's properties in Southeast Missouri were placed in October, on a six-day week instead of five days. In order to maintain this schedule and to be prepared, if necessary, to operate the mills seven days per week, the company has received priorities and orders placed for approximately $1,500,000 for the equipment and material.

The production from the two zinc mining properties located in Northern New York, which were already operating in 1940 on a six-day week schedule, was increased during 1941 by approximately 5½ percent.

The company has taken constructive steps to increase its zinc smelting facilities. At the electro-thermic smelter and sulphuric acid plant located in Western Pennsylvania, expenditures for plant and equipment have totaled $1,142,288.60 during the past two years.

Arrangements have been made to place the Block "P" zinc and lead mine in Montana, in production during the first quarter of 1942. This property was closed down in 1932 because of low metal prices.

In the Joplin area, the Jarrett mine of Kansas Explorations, Inc., was shut down due to exhaustion of its ore reserves. The new Snapp property was placed in production in July with satisfactory results.

Screening Facts

Not Just Claims

PREPARATION and concentration plants throughout the Mining Industry all agree that their screening equipment is the heart of their plant and to produce profits, must function efficiently. Simplicity Gyrating Screens do fulfill this requirement. The best proof of this fact is that over 1300 operating plants, each having from one to forty-six Simplicity machines, are on our list of known users.

In one coal screening operation, a 6′ x 16′ shaker screen was replaced by a 5′ x 12′ Simplicity Gyrating Screen. With the shaker screen, 85 minutes were required to load one carload of egg coal. With the Simplicity Screen, only 20 minutes were required and in addition 15% more coal was recovered.

The Simplicity Gyrating Screens are outstanding in their freedom from external vibration, so they can be placed in tipples and bridges without concern over possible damage to the supporting structure. This feature, combined with their large capacity and freedom from the usual maintenance costs, has established them as favorites with all their users.

For screening facts, ask your Simplicity Representative or write for descriptive bulletin

Simplicity Engineering Company

DURAND, MICHIGAN

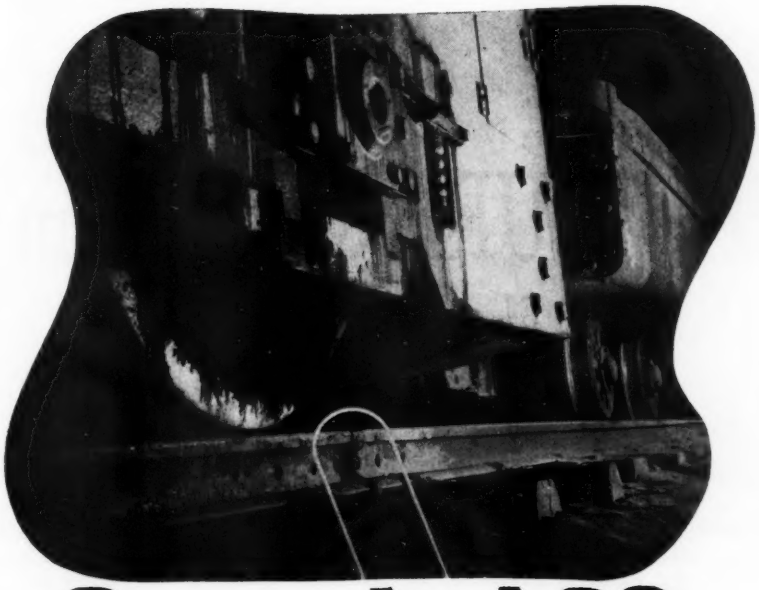
Power Distribution

(*Continued from page* 32)

hazardous than circuits of lower voltage. It is quite true, however, that these hazards can be minimized. It might be said that greater hazards exist in the case of circuits of lower voltage due to the carelessness with which they are sometimes handled and the abuses of protective devices. No accidents to persons arising from the use of underground cables are known to the author, although there are several cases in which men have dug into live cables with picks or digging bars. These occurrences are rare and seldom happen repeatedly at the same property. On the basis of experience, undue hazards do not seem to be presented by the use of properly installed underground cables.

In conclusion:

Probably no greater uplift to the morale of a mining organization is possible than will be noted following the conclusion of a well planned power improvement program. It is quite surely a fact that general dissatisfaction, grumbling and a general let down of the working will of good men is the result of "poor power" and its attendant difficulties. Electrical efficiency is important, of course, but quite secondary. The particular corrective method used is also of consequence but the real gain is the attainment of intended production rates and freedom from the ill effects of inadequate power supply.



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PER TRACK JOINT

The statement that Thermit welding of coal mine track saves money is no idle claim.

A recent test of 104 joints in a leading mine showed the cost of a Thermit welded joint over the life of the track to be $5.24, compared with $6.56 for the conventional angle-bar-and-bond joint.

Chief reasons for the economy of Thermit welded track are substantial power savings, due to the superior conductivity of continuous rail, and the complete elimination of joint repairs, which represent about 45% of track maintenance costs.

Other benefits of Thermit welded coal mine track are longer rail life because of absence of battered and cupped rail ends, smoother operation of cars, and less wear and tear on rolling stock.

Send for booklet, "Continuous Rail for Main Haulage Track."

VICTORY NOTE

Tremendous demands for aluminum for war production have caused a temporary shortage of Thermit for rail welding. You will want to keep this ideal rail joint in mind, however, if you cannot get Thermit today.

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Dr. Nelson Clarifies P-56

A further statement relative to the controversy over amendments to Preference Rating Order P-56 (see also editorial page) is contained in the following letter from Dr. Wilbur A. Nelson, WPB's Mining Branch Administrator to Senators from Western mining states:

"In recent conferences you and certain of your colleagues brought to the attention of the War Production Board the numerous inquiries received from mining companies and the apparent difficulties those companies have encountered in regard to the obtaining of equipment and machinery for the operation of mines under existing priorities orders. Those discussions have been helpful in bringing under review the application of those orders and giving opportunity to remove some apparent widespread misconceptions as to their effect.

"I am setting forth in this letter the present scope and operation of those orders so that the information will be readily available to the industry in general.

"Preference Rating Order P-56 has been the cause of most of the confusion. This order was designed to enable operators to obtain, with a minimum of delay, material and equipment for maintenance and development of properties having a high content of minerals which are critical to the war effort.

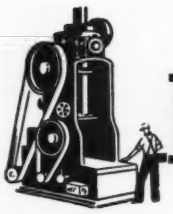
"This order, as amended, contains no provision prohibiting any mine operator from obtaining any equipment that he may need to operate his mine. The order simply provides that mine operators who have 70 percent or more of the productive value in ores which are critical to the war effort receive serial numbers which entitle them to preferred treatment in obtaining material and equipment. Operators of other mines are, however, entitled to use the lower ratings granted by Preference Rating Order P-100, which, under present circumstances, will enable them to obtain a good many types of operating supplies though obviously not the more critical items. In addition, these other operators are entitled to make individual applications for serial numbers which will put them in the preferred category.

"These applications must be accompanied by the data called for in the form No. 26615 which is available at this office and at War Production Board field offices, in the mining states. On the basis of similar applications serial numbers under P-56 have already been re-issued to about 70 mining properties in the Rocky Mountain area. We do, however, want to make it clear that we are not prepared to grant vital machines to any mines where there is not a substantial production of the critical materials we need to win the war.

"Again, many thanks for your helpful suggestions and consideration of this whole matter.

"Very truly yours,

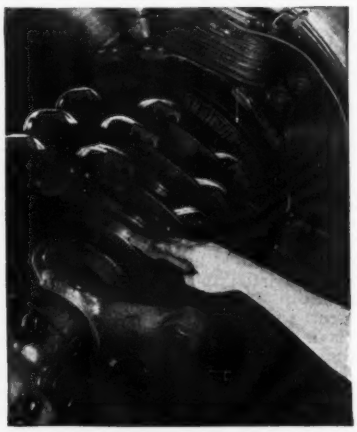
"WILBUR A NELSON,
"Administrator of Mining Branch."



MANUFACTURERS' Forum

New Burnisher Material for Care of Commutators and Rings

Care of commutators and rings has always been a source of concern among those charged with the maintenance of motors and generators. Such factors as location, humidity, temperature, abrasive and magnetic dusts, explosive and corrosive fumes, splashing liquids, and a variety of similar hazards effect commutation.



Often the wrong brush grade selection will deposit film on the commutator. Good commutation is good performance under all conditions without injury to the equipment. The preservation of the proper relation between brushes which ride a commutator and the revolving commutator itself is very definitely governed by the condition of the commutator face. It naturally follows that such important factors as input and output are materially affected.

Engineers of the Ohio Carbon Company, Cleveland, Ohio, have developed a material to maintain good performance of commutators and rings without shutting down or dismantling motors or generators. It is made of nonconductive materials and can be safely used while the machine is in operation. It consists of a wooden handle and burnishing material. Styles for all sizes of commutators and rings ranging from fractional horsepower to multiple horsepower are available. It is comparatively as simple to use as an eraser.

This unusual material is said to hone the commutator to a degree impossible with the finest type of cutting tool. The manufacturer states the burnisher must not be confused with a commutator stone as there is no cutting action. It will not reduce high mica, flat or burned spots. The burnisher polished to a perfect face removing only the surface film. Occasionally a slight trace of copper is picked up but this is negligible. If this occurs merely brush off with a cloth and continue.

Portable Scraper Hauler

A compact yet powerful scraper hauler, the S-211, is announced by Sullivan Machinery Company, Michigan City, Ind. It is suitable for small jobs or in close workings; for handling ore in preliminary rounds of sub-level drifts, short clean-up jobs in isolated workings, mucking out short cross-cuts, handling waste fill and many other numerous similar jobs formerly done by hand operation. This rugged portable hauler is 27 inches long and passes through a 12 x 14-inch opening. It weighs 250 pounds (less rope guides) and is a one-man machine for most operations. Fast rope speed (125 feet per minute) is developed through the manufacturer's patented "Turbinair" motor.

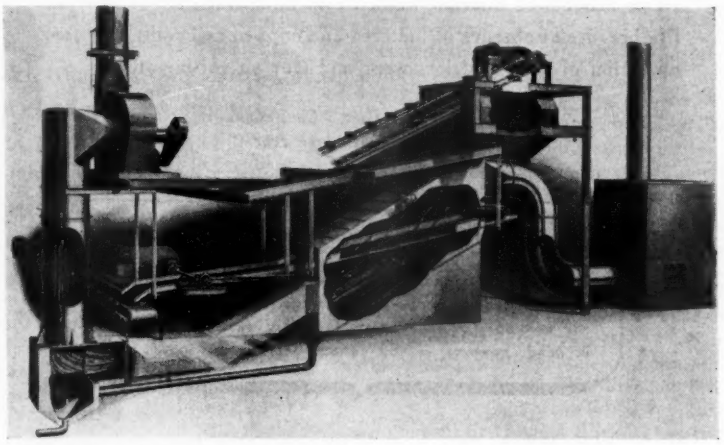
With its high rope pull and great power per foot of air used, the S-211 Turbinair Hauler is said to out-pull any other hauler in its class. Rated rope pull is 1,000 pounds but by speeding the motor and suddenly applying the clutch it momentarily pulls more than twice this load—an advantage when scraping large boulders. The S-211 can be equipped with either Turbinair or electric motor.

New Coal Dryer

The Link-Belt Company, Chicago, announces a new dryer for the effective removal of surface moisture from sized coal. Known as the Link-Belt "SS" Dryer, it combines mechanical dehydration with heat drying, and is available for drying sized coal of No. 10 mesh and up. The new unit comprises a drying chamber with perforated reciprocating-plate drying surface; coal inlet and outlet; hot air inlet from a coal-fired furnace; and an exhaust fan for drawing the hot air into chamber, over and through the thin bed of coal, down through perforations in the reciprocating plate, to the exhaust stack.

The operation of the moving element is analogous to that of the familiar shaker screen excepting that in the case of the "SS" Dryer the perforations are small and are intended only for passage of drying air.

It is stated that inasmuch as the coal passes through the dryer in a thin bed at slow speed, it is thoroughly, uniformly dried with low temperature air and discharged relatively cool; also that comparatively little power is required for operation of exhaust fan and reciprocating plate.



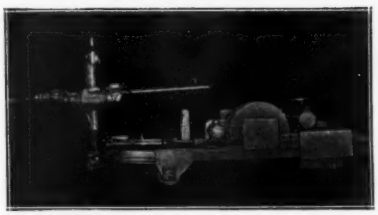
The above diagram indicates the flow of hot air passing over and through a slowly-moving thin bed of coal in the drying chamber of the new Link-Belt "SS" dryer. It also illustrates typical use of conveying equipment for bringing the coal to dryer hopper and carrying away the dried product

Electronic Control of Mechanical Feeders on Pulverizing Machines

An electronic robot now controls the mechanical feeding of pulverizing machinery with far greater accuracy and economy than would be humanly possible. Such close and constant check up provided by the Mosher Automatic Control safeguards against such commonplace troubles as clogging, overheating and motor burnouts arising from overloading because of variations from lot to lot, due in turn to change in moisture content which increases or decreases grindability. The Automatic Control is available through Max Mosher, New York City, and St. Louis, Mo.

One-Man Truck-Mounted Coal Drill

A new one-man, self-propelled, truck-mounted coal drill known as the CP-1800 Tramdrill is the latest announcement of new equipment by the Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. Thorough tests and time studies in prominent

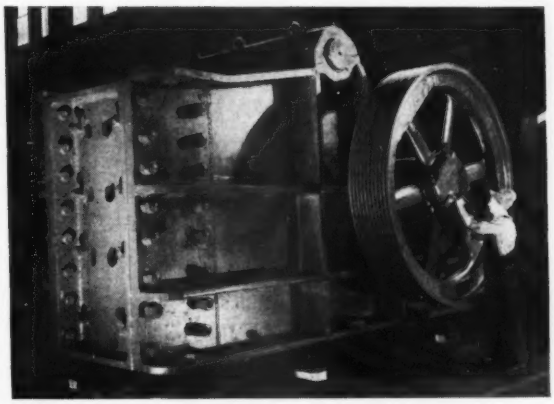


New one-man Tramdrill announced by the Chicago Pneumatic Tool Co.

coal mines have shown that the Tramdrill can be moved from one center to another and set-up ready for operation in one minute. Records show that 80 to 100 9-foot holes in coal have been drilled per seven-hour shift in contrast with the average of 60 to 70 holes per shift by two men with the standard post mounted drill.

Designed for trackless mines using mobile loaders and shuttle cars, the CP Tramdrill has many interesting features—compactness, lightweight, top and bottom drilling on 8-foot centers, quick set-up, hydraulically operated post, automatic cable reel, four miles per hour tramming speed.

New Crusher Design



This jaw crusher is the first of an entirely new design of all steel ore and rock crushers to be completed by The West Allis Works of the Allis-Chalmers Manufacturing Co. Weighing approximately 130,000 pounds, the crusher has a receiving opening 48 x 42in. The new design will be used in the defense industries for the crushing of extremely hard ore.

Ball Grip Couplings

A new type ball grip coupling fully tested for high pressures as well as vacuum, permitting flexibility at the joint and simplicity in making connection or disconnecting has recently been introduced by Hanlon-Waters, Inc., Tulsa, Okla.

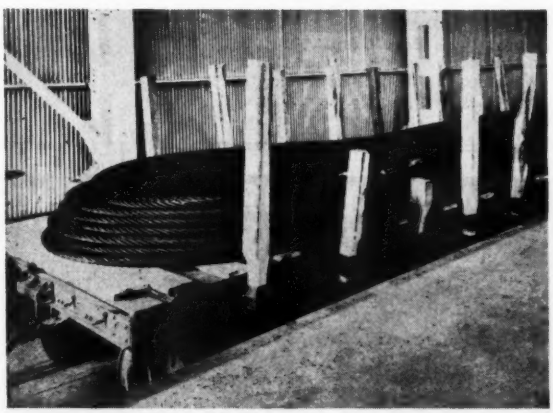
The H-W Ball Grip Couplings consist of a housing with ball retainer and a flexible sealing gasket. The ball retainer or cage carries a plurality of balls and a frictionally engaging means, so that after the pipe is inserted and pulled outward the balls are brought into contact with the tapered surface causing a positive lock, preventing the pipe from being withdrawn. One bolt tightens connection and the same bolt reversed automatically allows coupling to be dismantled. No special tools are required, a small size wrench is all that is necessary to take coupling off the pipe, apply tension and at the same time rotate the coupling. All couplings are provided with a pipe stop to assure pipe being centered in coupling. The coupling further permits rotating of valves and fittings on pipe axis without disconnecting.

Ameripol Hose

A new type hose for all standard paint and lacquer spraying equipment, with the tube built of Ameripol, its own type of synthetic rubber developed in its laboratories, is announced by the B. F. Goodrich Company, Akron, Ohio. The new line replaces the company's Lacquer hose and its Mainstay line of paint spray hose.

The new hose is made in inside diameters of ¼-, 5/16-, ⅜- and ½-in. and outside diameters of ½-, 39/64-, 11/16-, and ⅞-in., all standard dimensions for standard paint and lacquer spraying equipment.

Long Rope Shipped on Flat Car



This 4,000-ft. length of 2¾-in. wire rope was shipped as shown to obviate the difficult handling problems involved in following the usual practice of shipping it on a reel. The rope has a tensile strength of 101 tons, and was manufactured by the Williamsport Division of Bethlehem Steel Company, Williamsport, Pa. It was purchased by the Central Railroad of New Jersey, and will be employed to haul loaded coal cars up the Ashley Incline near Wilkes-Barre, Pa.

New Drum Controllers Announced

A new line of drum controllers for small cranes and hoists is announced by Cutler-Hammer, Inc., pioneer electrical manufacturers. Small and compact in size, these new drums have several features of interest.

A rope operating lever, embodying a new equalized torque principle, entirely eliminates cumbersome sheave wheel, rope guard and external return spring, and provides smooth, easy operation even when the rope is pulled at an angle. A new anti-plug feature increases drum life by making it impossible to whip drum from full forward to full reverse position. Drum can be reversed quickly, but yet a definite time delay is required in the off position.

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April 27-28

19th Annual Coal Convention

AMERICAN MINING CONGRESS

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Have that powerful elliptical screening action that keeps screen mesh free from blinding, producing sharp separations and largest capacity.

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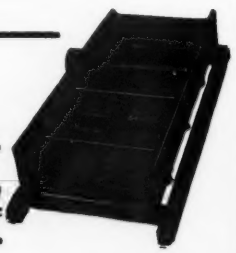

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We Look Into the Earth

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Pennsylvania Drilling Co.
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Drilling Contractors

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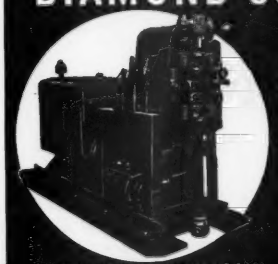
DIAMOND CORE DRILLING

CONTRACTORS



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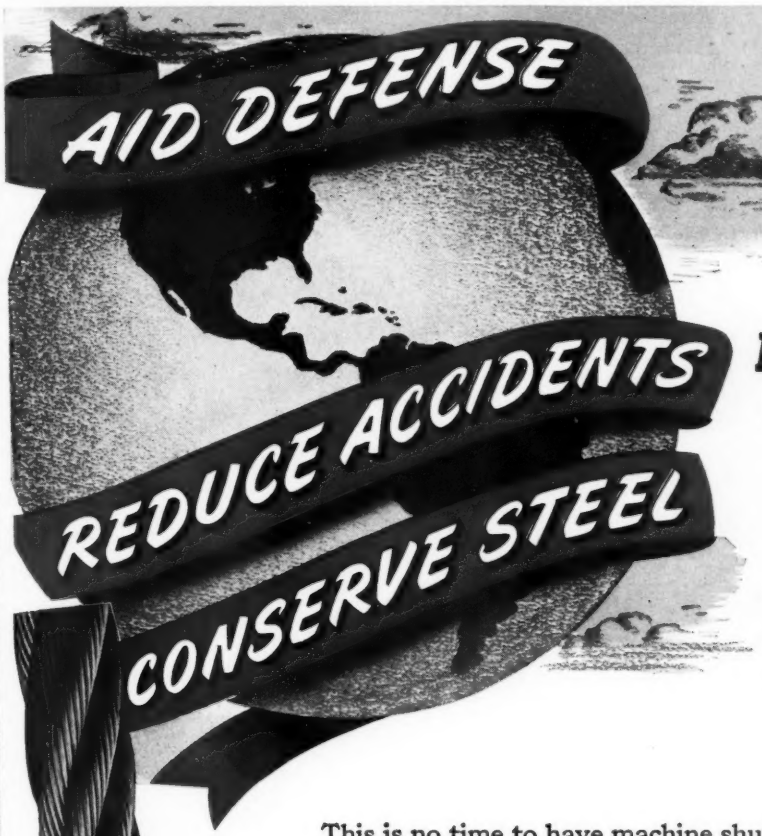

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This is no time to have machine shutdowns. By lasting so much longer **TRU-LAY PREFORMED** reduces shutdown frequency and steadies production.

This is no time to have workmen laid up with blood-poisoned hands. Some operators have drastically reduced accidents by adopting American Cable **TRU-LAY PREFORMED**—the *safer* rope.

This is no time to waste steel through the use of short-lived equipment. By lasting longer and working better **TRU-LAY PREFORMED** conserves steel for other essential machines.

American Cable engineers will gladly give you the benefit of their experience in helping you make your wire ropes last longer. All American Cable ropes made of Improved Plow Steel are identified by the Emerald Strand.

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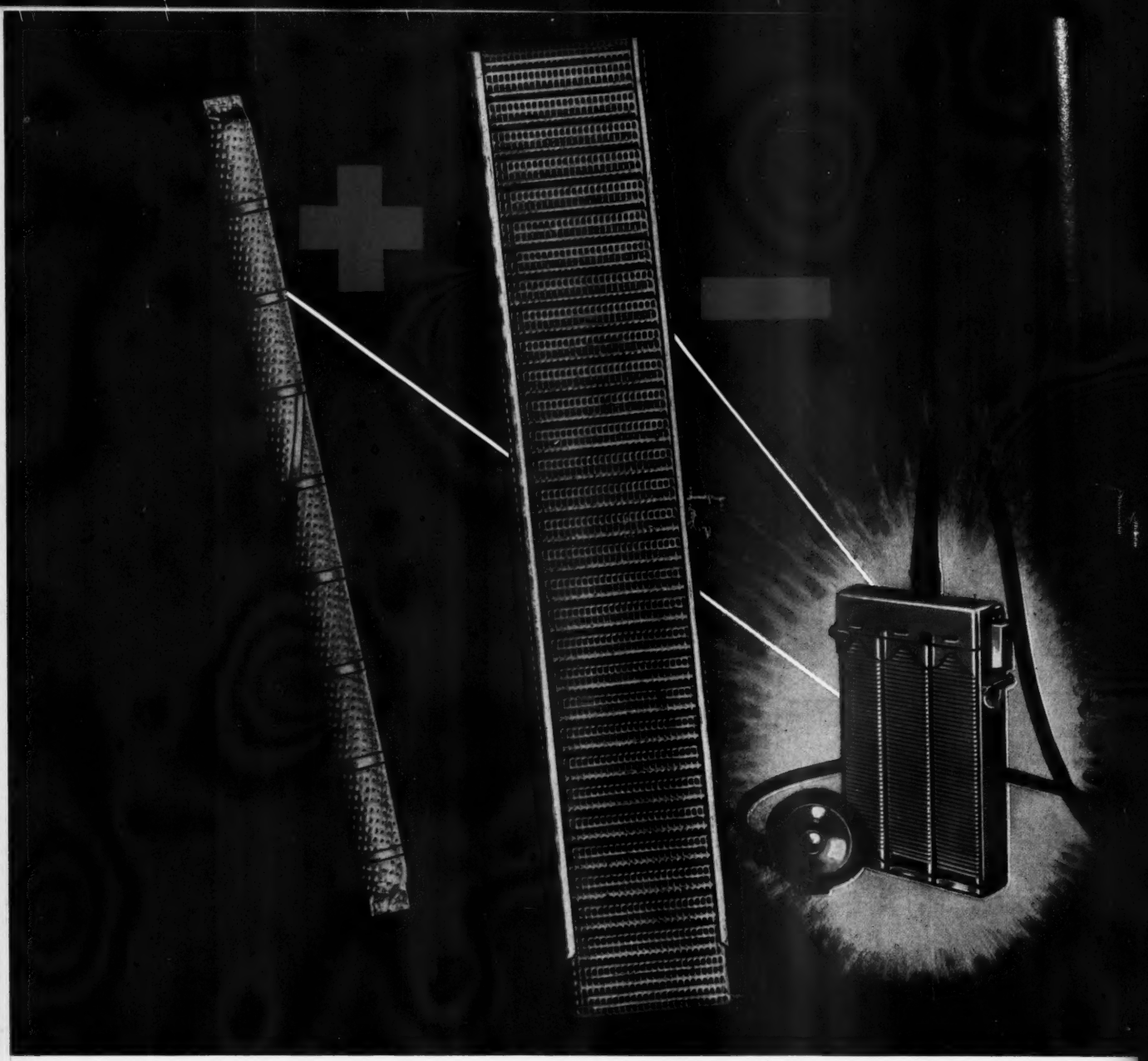

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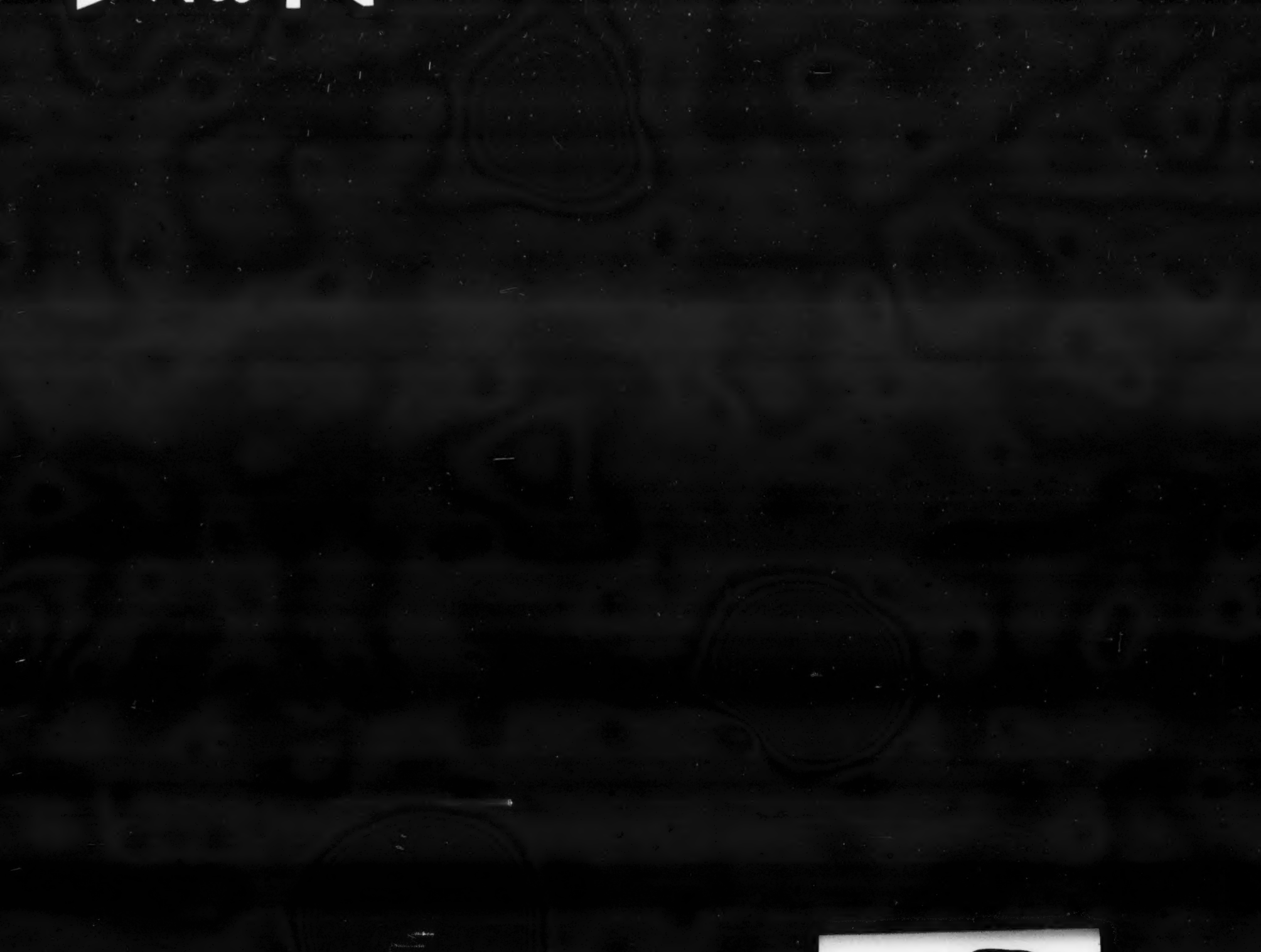
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